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ABSTRACT

This manual addresses specific aspects of the development and implementation of articulated vocational programs between high schools and colleges. The approach presented in the manual was derived from research and the experiences of the Paris Junior College (Texas) project staff who developed a "2 + 2" articulated career ladder curriculum for nursing education. Chapter 1 contains background information, underscores the need for articulated curricula, and provides relevant definitions. Chapter 2 describes types of needs assessment procedures and emphasizes their importance, while chapter 3 examines the composition, creation, orientation, and use of the curriculum committee. Chapter 4 describes curriculum development, focusing on occupational requirements, career ladders, instructional analysis, student prerequisites, support courses, course prerequisites, and curriculum finalization. Chapter 5 reviews the content of basic course outlines, including objectives, learning activities, tools and equipment, physical facilities, instructional materials, competency profiles, student monitoring, and performance exams. Chapter 6 offers guidance on instructor qualifications, chapter 7 discusses issues related to program/curriculum accreditation, and chapter 8 considers the roles and responsibilities of "2 + 2" development and implementation staff. Chapters 9 and 10 offer information on conducting student follow-ups and developing articulation agreements. Finally, chapter 11 deals with considerations related to program/curriculum evaluation. Appendixes discuss establishing a definition of articulation and present a survey used to validate tasks and competencies. (JMC)

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2 + 2
Secondary Postsecondary

Articulated Curriculum for Health Occupations

By

Bill E. Lovelace
David Ingram
Victoria Oglesby

A How-To-Manual

JC 900 395

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2 + 2
Secondary Postsecondary

Articulated Curriculum for Health Occupations

A How-To Manual

Prepared by

Bill E. Lovelace, David Ingram,
and Victoria Oglesby
Paris Junior College

for

The Texas Higher Education Coordinating Board
Community College and Technical Institutes Division

in cooperation

with the Paris Independent School District
and the Texas Education Agency

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Ms. Cynthia Amerson, Instructor, RN, MSN
Northeast Texas Community College
Mt. Pleasant, Texas

Ms. Linda Campbell, Associate Professor, Ph.D., RN
The University of Texas of Tyler
Tyler, Texas

Ms. Deborah Cody, Coordinator
Health and Medical Occupations
Northeast Texas Community College
Mt. Pleasant, Texas

Mr. Gaylon Maddox, Instructor, RN, MS
Paris Junior College
Paris, Texas

Ms. Barbara Robertson, Instructor
Health Occupations Education
Plano Independent School District
Plano, Texas

Ms. Nancy Stevenson, RN, MSed
Health Occupations Education Instructor/Coordinator
Marshall Independent School District
Marshall, Texas

and

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PREFACE

The purpose of this publication is to serve as a resource for secondary and postsecondary administrators who are interested in the process of developing and implementing 2+2 programs.

The *How To Manual* contains ten chapters which address specific aspects of the development and implementation of 2+2 occupational programs. The approach presented in this manual was derived from research, but more importantly from experiences of the project staff who developed the 2+2 articulated career ladder curriculum for the registered nurse. I hope that the procedures presented in this manual will be useful to you in the development and implementation of 2+2 occupational programs in secondary and postsecondary institutions in Texas.

Carrie H. Nelson, Ph. D.
Program Officer, Project Staff Advisor
Community Colleges and Technical Institutes
Texas Higher Education Coordinating Board

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I

INTRODUCTION

By mandate of the Texas Legislature, secondary and postsecondary vocational and technical programs must be articulated. In the last four years the term "2+2" has been used indiscriminately to describe efforts to articulate vocational and technical programs between the secondary and postsecondary levels.

A review of the literature does not reveal specifically when or where the term "2+2" was first used in the field of vocational and technical education. The 1968 Amendments to the Vocational Act of 1963 provided for the use of federal vocational funds for instruction designed to prepare students for enrollment in technical/vocational education at a higher education level. Policies of the Texas State Board of Education provided for the use of vocational funds for pre-technical programs. Attempts by vocational staff of the Texas Education Agency to install pre-technical programs in the public schools were rebuked by vocational administrators in school districts capable of offering pre-technical education. It was proposed in the late 60's and early 70's that pre-technical programs or courses would have a heavy emphasis on the application of the sciences (especially physics), math and communication skills required by technical occupations. The objective of the pre-technical programs was for enrollment in a technical program at either the secondary or postsecondary level. The development of job skills for employment was not an objective of pre-technical programs.

There are indications that with the emphasis at the national and state levels for accountability and demand to reduce duplication of effort of secondary and postsecondary schools, educational leaders felt that the concept for the 2+2 or prep-baccalaureate program could be used effectively in vocational and technical education. A great number of vocational and technical educators see a four-year articulated curriculum beginning at the eleventh grade as a solution to a new problem that has emerged for vocational and technical education. The new problem stated as a question is: "How do community/junior colleges and two-year technical institutes meet new and additional workforce requirements of employers within the maximum semester hours of college credit set for an Associate Degree?" The Texas Higher Education Coordinating Board is advocating the use of a 2+2 curriculum to meet the additional workforce requirements. The Texas Higher Education Coordinating Board has defined 2+2 programs as:

> 2+2 programs are articulated, competency-based technical and vocational programs which link the last two years of secondary education with the first two years of postsecondary education to create a strong four-year articulated curriculum which produces graduates with advanced skills. This type of articulation streamlines occupational program fundamentals in order to make room in the two-year postsecondary curriculum to teach more advanced technical skills that students would normally receive in traditional or time shortened programs.

It appears that the 2+2 or four-year articulated vocational/technical education curriculum will meet this new requirement for a highly qualified technical workforce. As with other innovations developed to solve a specific problem, educators see the innovation as a panacea for other problems unique to the educational community.

Currently, it appears that the 2+2 innovation is in the "jargon phase" through which all educational innovations pass. A review of the literature revealed that the 2+2 concept first emerged as a result of efforts to avoid duplication of effort by secondary schools and two-year postsecondary institutions by articulating the vocational/technical offerings of the two levels of instruction.

In 1986 the National Council for Occupational Education (an affiliate of AACJC) conducted a survey related to occupational program articulation for the purpose of standardizing articulation terminology. The most common terms and their meanings identified by the study are listed below:

ARTICULATION "A planned process linking two or more educational systems to help students make a smooth transition from one level or program to another without experiencing delays or duplication of learning", was the most standard definition cited in the literature reviewed by the task force. Simply put, articulation is a planned process to help students make a smooth transition from one program, course, or educational level to the next.

ADVANCED PLACEMENT "Any arrangement that enables secondary students to receive credit for or bypass courses in a post-secondary program." These programs are often referred to as "time-shortened" programs since post-secondary credit is granted for accomplishments at the secondary level. Generally, advanced placement is available to those students with high grade-point averages or high scores on placement tests. Advanced placement is also the most common and least complicated form of articulation activity because fewer curriculum changes are required. Advanced placement or time-shortened agreements were in existence at eighty-two percent (82%) of the responding institutions.

TECH PREP

A pre-technical program that provides a broad basic background in technology in order to produce better prepared students for entry into post-secondary technical training programs. The core curriculum at the high school level usually consists of preparation in the applied sciences, mathematics, and technical writing. This type of articulation activity was reported by thirty-two percent (32%) of the respondents.

"2+2" ARTICULATION

This is a four-year articulation plan in which the first two years are taught at the secondary level (grades 11 and 12), and the second two years are taught at the post-secondary level (grades 13 and 14). Since this is a four-year program, exit points are usually built-in along the way which permit students to exit the program after grades twelve, thirteen, or fourteen with a diploma, certificate, or associate degree. Two-plus-two programs require the highest degree of involvement and the most coordination and cooperation between and among administrators, faculty members, and counselors. Thirty-seven percent of the respondents (37%) reported articulation activity in two-plus-two programs.

"2+2+2" ARTICULATION

This is a six-year articulation plan in which the first two years are taught at the secondary level (grades 11 and 12), the second two years at the community, junior or technical college (grades 13 and 14), and the third two years at a four-year college or university (grades 15 and 16). Students may exit this program with either a diploma, certificate, associate degree, or bachelor's degree. Although this type of articulation activity was not specifically addressed in the survey, ninety percent (90%) of the respondents reported activity in programs to help students progress from the two-year post-secondary level to the four-year post-secondary level.

In an attempt to pass through the jargon phase as fast as possible a 2+2 user's group was created by the Texas Higher Education Coordinating Board. One of the activities performed by the 2+2 user's group was the development of terminology and definitions to guide the group in its endeavors. A copy of the definitions resulting from the activity is presented in Appendix A.

The National Center for Education Statistics has described technical education in the following manner:

> Technical education is concerned with that body of knowledge organized in a planned sequence of classroom and laboratory experiences, usually at the postsecondary level, to prepare pupils for a cluster of job opportunities in a specialized field of technology. The program of instruction normally includes the study of underlying sciences and supporting mathematics inherent in a technology . . . Technical education prepares for the occupational area between the skilled craftsman and the professional person, such as the physician, the engineer and the scientist.

The term TECH PREP was probably derived from the term "Technical Preparation" which was often used by educators to describe technical education. The proposed bills for the reauthorization of the Carl D. Perkins Vocational Education Act do not clarify the difference between "Tech Prep", "Prep Tech" and "Technical Education". A flier prepared by the Richmond County Schools and the Richmond Community College in North Carolina defines TECH PREP as:

> The TECH PREP (Technical Preparation) program is a course of study designed to meet the need for high school graduates to have more technically oriented educational backgrounds. Through a blending of higher level academic and vocational courses, TECH PREP prepares students for advanced courses required by two-year technical and community colleges.

The 1989 update of the Master Plan for Vocational and Technical Education in Texas was prepared as a blueprint for the delivery of vocational and technical education for the purpose of assisting in the development of a skilled and educated workforce in Texas. Simply stated, the Master Plan should serve as a guide for the development of available human resources to meet the requirements of the workplace. The overall purpose of the committee members who developed and updated the Master Plan was very similar, if not the same, as the purpose of the Douglas Commission created in Massachusetts in 1905. The purpose of the Douglas Commission was:

> The commission shall investigate the needs for education in the different grades of skill and responsibility in the various industries of the commonwealth. They shall investigate how far the needs are being met by the existing institutions, and shall consider what new forms of educational effort may be advisable and shall make such investigations as may be practicable through printed reports and the testimony of experts as to similar educational work done by other states, by the United States government and by foreign governments.

This comparison of purposes has been presented to emphasize the need for planners of 2+2 curricula to include research of the purposes of vocational and technical education in the development of "innovative" or "exemplary" designs for the development and delivery of vocational/technical instruction. The Master Plan encourages the development and implementation of an articulated curricula for technical occupations.

Goal 7: Innovation of Part 1 of the Master Plan recommends under

Management Action Plan

7-A1 Develop request for proposals and direct exemplary activity in (2+2) concept relating to the linkage of appropriate secondary vocational education curriculum and the postsecondary technical-vocational education curriculum.

Goal 2: Employer Needs of Part II of the Master Plan is to "provide flexible and timely technical and vocational education and training to meet the needs of employers for a skilled work force . . . "

The suggested strategy (2-e) Linkages Among Educational Systems under Goal 2 includes:

- Develop pilot 1+1, 2+1, 2+2 and 2+2+2 programs to link secondary and higher education training . . .

Both Goal 7 of Part I and Goal 2 of Part II of the Master Plan emphasize and promote developing and implementing 2+2 programs. The above observations have been made to make potential planners of 2+2 programs aware that there are many different concepts as to the design, purpose and benefits of 2+2 programs.

At the time this document was prepared, the Texas Education Agency had not disseminated a written definition of a 2+2 vocational/technical education program. Guidelines or standards for 2+2 programs have not been published and disseminated by the Texas Education Agency or the Texas Higher Education Coordinating Board.

However, both of the state agencies have developed and issued specifications for projects designed to develop, implement and evaluate 2+2 programs in Texas. A review of the specifications revealed four common requirements that must be met in the development of 2+2 projects.

The four common requirements recognized by the staff of the 2+2 articulated curriculum for registered nurse project are:

1. The curriculum must provide for an opportunity for high school students to develop salable skills upon completion of the first two years of the curriculum. (This requirement caused the staff to develop a career ladder curriculum with the occupation of the RN being at the top of the ladder).
2. The curriculum must be competency-based. (The project staff interpreted this requirement to mean that (1) the instructional content would be based on the competencies required by the workplace and (2) the achievement of the students (mastery of competencies) would be performance measured.
3. The curriculum would include both occupational specific courses and supporting courses of science, math and communication skills.
4. The 2+2 articulated curriculum would include additional competencies required by the workplace which currently are not being developed (due to maximum credit hour requirements) in the regular Associate Degree program.

A 2+2 articulated career ladder curriculum for nursing education was developed with an awareness of the background information provided above and in accordance with the specifications of the Request for Applications of the Texas Education Agency and the Request for Proposals of the Texas Higher Education Coordinating Board for 2+2 projects in health occupations.

II

NEEDS ASSESSMENT

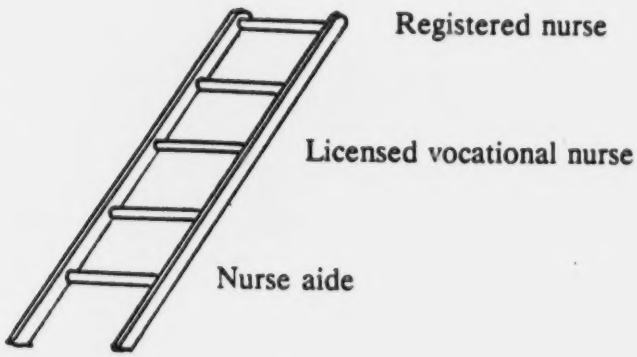
Both secondary schools and two-year postsecondary institutions offering vocational and technical education programs are required to document the need for new programs and the continuation of existing programs using labor market information. Also, both secondary schools and two-year postsecondary institutions are required to maintain articulation of each program that is offered at both educational levels. To meet these two requirements cooperative efforts are made by secondary and postsecondary institutions to continuously assess the training needs of employers. Two kinds of needs assessments are maintained. First is the need assessment to determine the need for new employees in the workplace. The second assessment is to determine the training requirements of new and existing employees. As with the need for new employees, the training requirement or competencies of the workplace is constantly changing with new technology. The change of the training requirements of the workplace mandates that the curriculum be expanded to include new competencies created by new technology.

When the results of the needs assessments reveal that additional competencies of technical occupations required by the workplace cannot be achieved by existing programs, there is a need for a 2+2 articulated curriculum (program). An articulated curriculum is defined in the Dictionary of Education (McGraw-Hill) as:

> a continuous curriculum in which there is a close relationship between elementary school, high school, and college curricula in order to prevent needless repetition and bring about coordination.

The 2+2 articulated curriculum should be developed to meet the identified additional requirements of the workplace for a specific technical occupation. The 2+2 articulated curriculum to be developed should also provide for a career ladder approach for the technical occupation(s) for which the 2+2 curriculum is to be developed.

As an example, the 2+2 nursing education program was developed with the occupation of registered nurse being at the top of the career ladder as shown below:



Using the career ladder approach in the development of a 2+2 articulated curriculum in health occupations is beneficial to students and employers alike. For the students -- it provides the student with the opportunity to exit and reenter the program at specified occupational levels. For the employer -- it assures a better prepared employee with greater competencies than is available in the existing nursing education programs that are articulated.

Features of the 2+2 curriculum for nursing education which are not found in other 2+2 programs include:

- The curriculum provides for a career ladder leading to the occupation of registered nurse.
- The curriculum provides for the development of advanced skills and knowledge (additional competencies).
- The curriculum provides for the supporting academic courses of math, science, and communication skills.

When it is determined, as a result of the continuous assessment of training needs, by cooperating secondary school(s) and two-year postsecondary institution(s) that there is a need for a 2+2 articulated curriculum for a technical program, a 2+2 curriculum committee should be created. The program planners of the secondary and postsecondary institutions in a state vocational planning region should cooperatively prepare a report of the needs assessment of the technical occupation. The report, documenting the need for a 2+2 articulated curriculum, should be submitted simultaneously to the superintendents and president of the cooperating institutions for approval to develop the needed 2+2. Immediately following the approval of the superintendent and president for jointly developing a 2+2 program a technical committee should be created and used for the development of the curriculum and other components of the program.

III

2+2 TECHNICAL COMMITTEE

Role

The 2+2 technical committee will play a key role in the development of the 2+2 program. In the developmental aspects of the program, the committee's primary function will be in the area of instructional content or in broader terms curriculum development. The 2+2 technical committee should be used in the curriculum development phase to:

1. Validate the competencies required of the workplace in the occupation(s) for which the articulated curriculum is to be developed.
2. Approve the curriculum developed.
3. Approve the content of basic course outlines developed for the approved curriculum.
4. Approve the criterion for determining mastery of each competency to be developed by the 2+2 program.
5. Make recommendations for the development and administration of competency exams.

The 2+2 technical committee may and will make other contributions to the development, installation, and evaluation of the 2+2 program being developed.

Composition

It is assumed that program advisory committees of the articulating community colleges and public secondary schools were involved in the assessments that identified the need for a 2+2 four-year articulated curriculum for a specific technical occupation. Therefore, members of the existing program advisory committees may be requested to serve on the 2+2 technical committee. The 2+2 technical committee should be composed of individuals interested in vocational and technical education and represent entities which include but are not limited to the following:

- individuals who are presently supervising entry-level workers in occupations on the career ladder
- individuals who are presently performing as senior-level workers in the occupation(s) for which the curriculum is being developed if appropriate
- an individual representing a state licensing agency and/or national accrediting agency for the occupations for which the curriculum is being developed
- from participating secondary school(s)
  - one instructor of the secondary program
  - one administrator of vocational education
  - one career counselor

  (Note: Two or more school districts should be represented on the 2 + 2 Technical Committee)
- from participating postsecondary institution(s)
  - one instructor of the postsecondary program

- one administrator of the postsecondary vocational/technical program
- one career counselor

It is recommended that the membership representing the workplace comprise seventy-five percent of the 2+2 technical committee. Since it would not be practical for representatives of the two state agencies (TEA and CB) to serve on all local 2+2 technical committees, it is highly recommended that appropriate staff of both agencies be informed periodically of the progress of the 2+2 development.

Creation

The local program planners of vocational and technical programs should cooperatively develop a list of proposed 2+2 technical committee members from the workplace and submit the names and positions requested to their respective superintendent and president. The superintendent and president would jointly or separately send written invitations to individuals in the workplace to serve on the committee. The written invitation to serve on the committee should specify the date, time, and place of the first meeting of the committee.

Orientation of Committee

The first meeting of the committee should be held for orienting the members to the purpose and procedures of developing the 2+2 program. At the orientation meeting the members should be made aware of the roles and responsibilities of each member of the committee. Also, at the orientation meeting, planners should discuss procedures for obtaining input from each of the committee members.

Use

As previously stated, the technical committee should play a key role in the development of the curriculum and instructional content of the 2+2 program. The committee should only be convened at times when the program developers (local staff of cooperating institutions and consultants) have materials (i.e. competencies to be validated, proposed curriculum, basic course outlines) to be reviewed and approved by the committee membership.

IV

DEVELOPING THE CURRICULUM

A. Analysis of Occupational Requirements

As used here the term "curriculum" means a systematic group of courses or sequence of subjects required for certification or licensure in a specific occupation or cluster of related occupations. It has been well documented by researchers of vocational and technical education and by developers of military training materials that curricula for occupational preparation must be based on the occupational requirements of the workplace. In years past the instructor of an occupational program was required to develop curriculum and courses of study to meet the needs of the workplace. During those years instructors of occupational preparation programs had to develop the instructional content using the process of occupational analysis. Today, vocational instructional materials specialists may rely on the expertise of public and private curriculum centers to provide them with a list of task inventories which have been developed by occupational analysis. Occupational analysis is a long drawn out process and must be performed by an individual trained in the science of analyzing occupations for training content.

Another procedure which is used to identify occupational or job requirements of the workplace is a process known as DACUM. "Developing A Curriculum" has emerged as an innovative and relatively new approach to occupational analysis. DACUM has been used to successfully analyze occupations for identifying the occupational requirements of the workplace. The DACUM committee, whose members are incumbent workers or

supervisors of those workers for the occupation(s) being analyzed, will identify the specific tasks or competencies performed by entry-level workers. The DACUM process, using a group of eight to twelve expert workers, takes about three days to identify the performance requirements of the occupation. If DACUM is to be successful, the committee members must work under the guidance of a trained and experienced DACUM facilitator.

Another process that may be used locally that provides input from a greater number of expert workers is referred to as a local validation of previously identified competencies or tasks which are available as "task inventories" for a specific occupation. Local planners of vocational and technical programs can obtain the task inventories from public, private and military curriculum centers. Also competency lists or requirements may be obtained from state and national licensing or accreditation agencies or organizations. These lists of tasks/competencies can be validated by surveying employers of workers of the occupation for which instruction is being developed or improved. An example of a survey used to validate the tasks/competencies is presented in Appendix B. If this procedure is used, the survey form should be left open-ended. Leaving the survey form open-ended provides the respondents an opportunity to list any new requirements (tasks and/or knowledge) of the occupation that has resulted from technological advances in the occupation. In many cases, new or advanced requirements of the workplace will occur long before they are required by a licensing agency or an accreditation organization.

The terms "competencies", "tasks", "duties", and "functions" are being used as being synonymous by many who are advocating or developing 2+2s. As used in the project which developed this document, the term "competency" was originally defined as a grouping

of tasks, knowledge, and attitudes needed for completing an assignment or job performed by an individual in the workplace under a specific occupational title. However, it was found that time allotted the project did not permit the grouping of tasks by competencies.

The completion of an assignment or job will require the performance of one or more competencies. The term "job" as used above does not mean the same as the terms "position" and "career". The term "job" as used here refers to the responsibilities or assignments that are prescribed for an individual in a job description for an occupational title or position of employment. There is as much or more confusion when using the term "competency" as there is when using the term "2+2 articulated program." Educational leaders have used the term "competency" without definition. The term has been used so often by recognized leaders that the term is used by all educators sans definition. Until the term "competency" is defined by appropriate state educational agencies there will be communication and systems problems in developing 2+2 curricula and related materials. Concurrently, the 2+2 articulated curriculum for the nurse education project has used the terms "competency and "task" interchangeably.

A graphic description of occupational analysis is shown by the figures described below. Figure 1 shows the relationships of an occupation to the occupational division and competencies. Practically every occupation can be divided into divisions of work. Usually occupations will be divided into divisions, areas, or duties such as: (1) materials used; (2) product produced; (3) services performed; or (4) equipment used. The primary purpose of dividing the occupation into divisions or duty areas is for the designation of training areas. Also, it is a means of obtaining an instructional order from simple to complex. In

most cases, each division of an occupation has competencies that are independent of the competencies in other divisions. However, it may be found that there are some tasks and knowledge that are common to one or more divisions.

Figure 2 shows the relationships of the occupation to divisions, tasks, and steps. A step is the smallest manipulative activity into which a task can be divided.

Figure 3 provides an example of the relationships shown in Figure 2 for the licensed vocational nurse.

The graphic arrangement of the occupational divisions, competencies, and tasks will make it easier to structure the curriculum by courses.

Relationship of Occupation To Divisions and Competencies

Occupation
(Position of Employment)

Occupational Division 1 (Area/Duty)	Occupational Division 2 (Area/Duty)	Occupational Division 3 (Area/Duty)	Occupational Division 4 (Area/Duty)
Competencies	Competencies	Competencies	Competencies

Figure 1

Relationships Of Occupational Division For Competencies, Tasks and Steps

Occupation
(Position of employment)

Occupational
Division 1
(Area/Duty)

Competency 1	Competency 2	Competency 3	Competency 4	Competency 5
Tasks	Tasks	Tasks	Tasks	Tasks
Steps of each Task	Steps of each Task	Steps of each Task	Steps of each Task	Steps of each Task

Figure 2

Example Of The Relationships Of Occupation, Occupational Division, Competencies, Tasks and Steps

(Occupation) — Licensed, Vocational Nurse

(Division) — Care for Obstetric and New Born Patients

(Competencies)

1. Care for prenatal patients
2. Care for patients during labor and delivery
3. Care for post-partem patients
4. Provide immediate post delivery care of infants
5. Provide care for newborn
6. Assist with feeding of infants

Task 1 | Task 2 | Tasks etc.

Step 1
Step 2
etc. | Step 1
etc. | Steps

Figure 3

B. Developing a Career Ladder

Developing a 2+2 articulated curriculum for a four-year program that provides students an opportunity to develop employment entry level skills at the completion of the first two years of the program provides a strong indication that a career ladder of occupations should be developed. In developing a 2+2 that culminates with the students earning an associate degree, the technical occupation for which the program is conducted would be at the top of the ladder. In the case of the 2+2 nursing education program, the registered nurse is at the top of the career ladder.

Documenting the other occupations on the career ladder requires a comparison of the results of the occupational analysis performed for each occupation assumed to be on the career ladder. The occupations of nurse aide and licensed vocational nurses were assumed to have a place on the career ladder for the registered nurse. In order to document this assumption the tasks resulting from the occupational analysis for each of the occupations was compared. An example of the first worksheet used to identify tasks common to all of the three occupations is shown on Table 1.

To develop a comparison of tasks for related occupations as shown on Table 1, all the tasks identified by the analysis of the related occupations must first be listed. Second, the list is reviewed and all duplication of the tasks statements are removed. This process provides one single, unduplicated list of tasks identified for all three of the occupations analyzed. At this point four different lists of tasks have been developed. Three lists of tasks, one for each of the three occupations, were developed by an analysis of each of the occupations. The fourth list contains all of the tasks of the other three lists. On the

TABLE 1

AN EXAMPLE OF A WORKSHEET USED TO IDENTIFY TASKS COMMON TO THE NURSE AIDE, LICENSED VOCATIONAL NURSE AND REGISTERED NURSE

Division No.	Competency No.	Task No.	Tasks Identified By Occupational Analysis	Nursing Occupations For Which The Tasks Were Identified		
				Nurse Aide	LVN[1]	RN[2]
			Task Statement			
			Task Statement			
			Task Statement		

fourth list, the task is listed only one time even if it was on all of the other three lists. The fourth list is placed on a chart shown on Table 1 and an X is placed by the task statement under each occupation for which the tasks was identified by an occupational analysis. After this process is completed as shown in Table 1, all of the tasks which are common to all three occupations and the tasks common to only two of the occupations are identified. The remaining tasks on the list are for the occupation that is at the top of the career ladder for the 2+2 being developed. An example of this comparison is shown on Table 2. A review of Table 2 reveals that the registered nurses (RN) (the occupation at the top of the ladder for the 2+2) must be competent to perform all of the tasks of all three of the occupations with one exception. The exception is the cluster of tasks performed by licensed vocational nurse (LVN) that are not performed by the RN. This cluster of tasks which create the exception deals with the tasks performed by the LVN in reporting to or in accepting leadership and supervision from the RN. After the final listing showing the commonality of tasks for the occupations on the career ladder the tasks should be sequenced in terms of "simple to complex" and/or "easy to difficult." After the tasks are sequenced they should be numbered beginning with the "easiest" or "most simple" tasks being numbered as 1 by competency and by occupational division. The curriculum developers may use whatever numbering system that they desire. One system that may be used would be "I-1, (1)." This would indicate task 1 by (1), competency 1 by 1 and occupational division I by I. Each task statement is numbered to permit future reference when clustering for courses and performing tasks analysis to identify instructional content.

TABLE 2

AN EXAMPLE OF THE COMMONALITY OF TASKS PERFORMED FOR THE OCCUPATIONS OF NURSE AIDE, LICENSED VOCATIONAL NURSE AND REGISTERED NURSE

Division No.	Competency No.	Task No.	Task	Occupations Performing Task		
				Nurse Aide	LVN_1	RN_2
		1.	Identify emergency equipment	x	x	x
		2.	Identify simple anatomy, physiology, and pathophysiology of body systems.	x	x	x
		3.	Identify abnormal/normal vital signs	x	x	x
		4.	Perform techniques for assessing signs	x	x	x
		5.	Utilize and demonstrate communication equipment specific to health occupations	x	x	x
		6.	Acquire BCLS certification - AHA course C standards	x	x	x
		7.	Demonstrate and perform basic first aid	x	x	x
		8.	Demonstrate appropriate personal appearance of a health care worker	x	x	x
		9.	Perform all types of patient baths	x	x	x
		10.	Assist patient in/out of bed	x	x	x
		11.	Administer range of motion	x	x	x
		12.	Prevent pressure areas	x	x	x
		13.	Assist with walking with support devices	x	x	x
			Evaluate care plans with an RN		x	
		85.	Discuss components of the Vocational Nurse Act		x	
		86.	Practice nursing within the ethical legal framework of the vocational nurse		x	
		87.	Assess and intervene in cardio-vascular illness		x	x

$_1$Licensed Vocational Nurse
$_2$Registered Nurse

TABLE 2 (continued)

AN EXAMPLE OF THE COMMONALITY OF TASKS PERFORMED FOR THE OCCUPATIONS OF NURSE AIDE, LICENSED VOCATIONAL NURSE AND REGISTERED NURSE

Division No.	Competency No.	Task No.	Task	Occupations Performing Task		
				Nurse Aide	LVN_1	RN_2
		88.	Perform neuro check		x	x
		89.	Insert and care for patients with airway devices		x	x
						x
		314.	Employ procedures to deal with crisis intervention			x
		315.	Analyze laboratory and diagnostic data			x
		316.	Interpret for others their scope and function			x
		317.	Evaluate emergency performance			x
		318.	Uses a knowledge of anatomy and physiology to promote patient teaching			x
		319.	Using an advanced knowledge of anatomy and physiology, evaluate the body's response to illness			x
		320.	Evaluate vital signs in relation to their use as diagnostic data regarding patient's health needs			x
		321.	Evaluate bandages applied for effectiveness			x
		322.	Design evacuation plans			x
		323.	Appraise care of fractures for effectiveness			x
		324.	Perform detailed head to toe assessment and interviewing			x

[1]Licensed Vocational Nurse
[2]Registered Nurse

Sequencing the competencies and tasks from easy to difficult or from simple to complex may be done by a practitioner of the occupation by recall. Recall will be the fastest way of sequencing, but it is subject to many errors. The easiest way to complete the sequencing of the tasks is to purchase lists of tasks which have been sequenced by professionals in the area of occupational analysis. The process used by trained professionals in sequencing the tasks and competencies is graphically described in Figure 4. Figure 4 is an example of an worksheet used to determine which tasks are involved most in the performance of the competencies of an occupational division. Each task on the list of tasks is checked by the competency in which the task is performed. When the worksheet is complete the task statements can be arranged into a sequential instructional order by placing the task having the greatest number of checks at the top of the list and placing the other tasks in descending order in relation to the number of times checked on the worksheet as shown on Figure 5. The competencies may also be rearranged into sequence by listing the competencies in ascending order according to the number of tasks performance for each competency.

Figure 4
Example of a Worksheet for Sequencing Tasks and Competencies for Instructional Purposes

NOTE: Example of a completed worksheet on page 30.

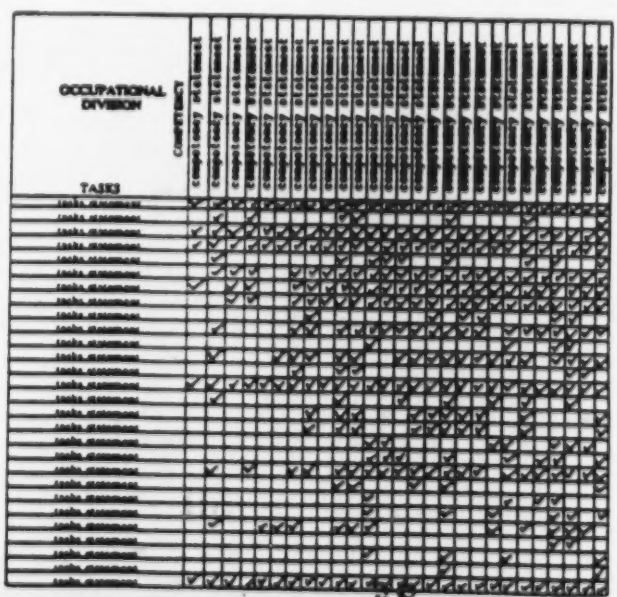
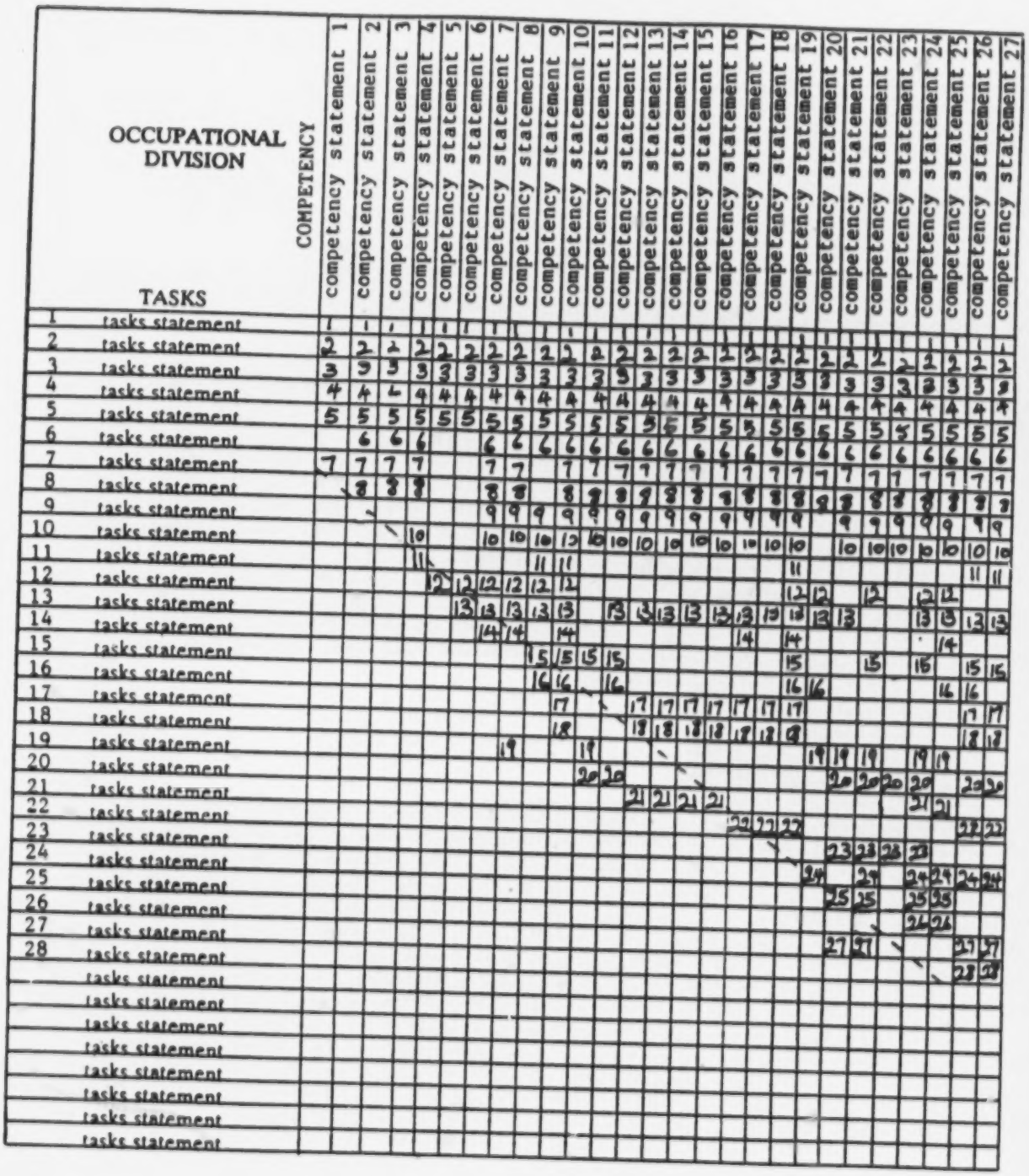


Figure 5

Example of A Completed Worksheet For Sequencing Tasks and Competencies For Instructional Purpose



C. Instructional Analysis

Instructional material developers for occupational preparation programs analyze each of the validated tasks of an occupation for instructional content. This process is known as task analysis or instructional analysis of tasks. The analysis is performed to identify the skills, knowledge and attitudes essential for the performance of the task. Table 3 provides an example of a worksheet used in recording the findings of the task analysis. An explanation of each of the column headings on the worksheet is provided in the column below the heading. In addition to identifying the instructional content for the occupational preparation program, the task analysis will assist in identifying student prerequisites and support courses for the curriculum.

When the task analysis is completed for each of the validated tasks of the occupation the major instructional topics or objectives will be easily observed. The term "objective" is another educational term that, when used without an identifier or adjective, creates confusion and misunderstanding. For example there are school objectives, program objectives, course objectives, instructional objectives, behavioral objectives, student objectives, performance objectives, terminal performance objectives, enabling objectives, lesson objectives, etc.

It becomes apparent that each task will become a major instructional topic or objective. The task should be written in behavioral terms for instructional purposes and may be taught as a single lesson. Further review of the task analysis may reveal that the development or mastery of the task by the learner may require an amount of related theory or knowledge that prevents instruction of the task being taught in only one lesson.

TABLE 3

Example of Worksheet Used In Performing A Task Analysis

Occupational Division: _____ Course Title: _____

Competency #: _____ Competency Statement: _____

Task #: _____ Task Statement: _____

Steps	Tools, Equipment, Materials	Theory or Related Information	Safety	Attitude - Ethics
(List each step (manipulative activity) essential to performing the task)	(List all tools, equipment and/or materials needed to perform the task)	(1. List all information, theory or related, needed to perform the task. the task. 2. List academic skills - math, English, science - that will be used. Identify academic skills that should have been previous to learning task and those which should be developed concurrently with the learning of the task.)	(List knowledge or practice needed for a safe of the task. Safety in relation to the individual performing the task and safety to or of the object for which the task is being performed. Legal safety requirements.)	(List attitudes and or ethics critical (to the performance of the

A review of the instructional content will provide an indication of the instructional time required for the learner to master the task being taught. When the instructional time is estimated for each task the curriculum developer can cluster the tasks into courses. The tasks should be clustered for the course by instructional sequence and within the number of clock hours allocated to the course by semester or year. All of the courses are sequenced to complete the occupational specific courses of the curriculum.

D. Student Prerequisite

Student prerequisites for enrolling in the program at the secondary level are usually established by the state education agency. State student prerequisites include but are not limited to age and grade placement. A local secondary student prerequisite that should be developed to comply with the requirement of House Bill 72, Article VI, Part H, Section 1, (n) which states: "...,

> each district enrolling a student in a vocational program shall consider the suitability of established curricula for the student and the adequacy of the student's academic preparation for admission to a particular vocational curriculum."

Student prerequisites at the postsecondary level should include: (1) prerequisites of all students entering the postsecondary institution and (2) completion of the secondary level courses of the 2+2 curriculum. Note: Completion of all of the secondary level courses does not mean that a student has mastered all of the competencies taught at the secondary level. Provision must be made for the student to master all secondary level competencies prior to continuing in the 2+2 program at the postsecondary level. This provision must be included in the articulation agreement.

E. Support Courses

The instructor of occupational specific preparation courses does not have time to teach all the cognitive skills essential for the learner to master the occupational specific content. Academic courses, and sometimes courses specific to another occupation, which support and assist the student in learning the occupational specific content must be included in the curriculum of the occupational preparation programs. The support courses can be identified by a review of the results of the analysis of the validated tasks which constitute the occupational specific courses of the curriculum.

F. Course Prerequisite

A review of the results of the analysis of each task will identify the academic skills the learner must have in order to understand and benefit from instruction. The listing of these academic skills will identify the non-occupational course prerequisites for enrolling in the program or an individual course of the program.

G. Finalizing The Curriculum

Each step or phase of the curriculum development process should be reviewed and approved by the curriculum committee. Approvals will come quickly if the staff of the curriculum provides documentation for each product (by step or phase) that is submitted

to the committee. Recommendations for improvement of products or processes made by the committee should be considered seriously by the project staff. The finalized curriculum will include the following:

1. Name of the occupation for which the program is preparing students to enter employment
2. A job description of the occupation
3. The objective of the curricula or program
4. A sequential listing of the occupational specific and support courses. Other courses required for the associate degree
5. Indicators of exit points if the curriculum includes other occupations of a career ladder
6. Student prerequisites
7. Course descriptions for each of the occupational specific courses
8. Job descriptions of the other occupations on the career ladder

A list of tasks or competencies to be developed by each course should always be maintained in order to document the validity of the instructional content.

An example of the proposed 2+2 articulated curriculum for nursing education is presented as Table 4 on the following pages.

TABLE 4

An Example of A 2+2 Articulated Curriculum For Nursing Education

OCCUPATION: REGISTERED NURSE

JOB DESCRIPTION: REGISTERED NURSE

The registered nurse renders professional nursing care to patients independently or in conjunction with care provided by physicians and other health care providers pursuant to the objectives and policies of the employing institution. Functions autonomously in order to carry out the decision making process.

Utilizes the nursing process to provide care to patients in a variety of health care settings. Collects data about patients, identifies specific needs/problems, develops and maintains plan of care, implements a plan of action, and evaluates outcomes of the interventions. Performs nursing techniques for the comfort and well-being of the patient. Assists with treatments and procedures according to physician's orders and nursing care plans. Observes, records, and reports to supervisor or physician patients' conditions and reactions to drugs, treatments, and significant incidents. Maintains patients' medical records on nursing assessments, actions taken and patient responses. Maintain patient and staff confidentiality.

Provides emotional support to patient, family and significant others. Explains procedures and treatments ordered to gain patients' cooperation and allay apprehension. Educates patients and significant others on an ongoing basis including discharge planning and follow-up treatment. Functions as a patient advocate and a member of a multi-disciplinary team. Serves as a positive role model and accepts responsibility in managing, supervising, and teaching Licensed Vocational Nurses, Nursing Assistants, Orderlies, and students. Delegates duties effectively. Demonstrates nursing techniques and procedures, and assists other personnel in rendering nursing care to patients. Effectively communicates with members of the multidisciplinary team.

Curriculum Objective:

The curriculum is designed to produce an individual with skills, knowledge, and abilities sufficient to sit for the National Council Licensure Examination for Registered Nurses and who performs safely and effectively in a variety of clinical settings as a professional nurse within the bounds of the Nurse Practice Act. Graduates will be able to care for patients with multidimensional health care needs/problems.

TABLE 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

COURSES BY GRADE LEVEL AND CREDIT FOR RN

	Grade	Semester Hours Credit
Secondary		
* Health Careers I	11	2 - 3
* Health Careers II	12	2 - 3
		4 - 6

SECONDARY PREREQUISITES FOR RN PROGRAM

Algebra I	Physical Science
Geometry	Biology
Algebra II	Chemistry
	Anatomy and Physiology or Biology II

* Eligible to sit for State Examination for Nurse Aide Registry

Postsecondary

	Grade	Semester Hours Credit
Nursing Process	13	2
Nursing: Basic Needs Ia	13	6
Nursing: Basis Needs II	13	6
Nursing Through the Life Span	13	6
Entry into Vocational Practice (LVN option)*	13	(4)
Nursing: Complex Need I	14	7
Nursing: Complex Needs II	14	7
Entry to Professional Practice	14	4
		38-42

** End grade 13---Eligible to sit for National Council Licensure Examination for Practical Nurses

*** This course would be taken only by those who desired to exit as a LVN

TABLE 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

POST-SECONDARY - SUPPORT COURSES FOR RN and LVN PROGRAM

	Grade 13		14	Semester Hours Credit
Introduction to Psychology	x			3
Computers in Nursing	x			1
Anatomy and Physiology I	x			4
Anatomy and Physiology II	x			4
College English	x			3
* Chemistry		x		4
* Sociology			x	3
* Microbiology			x	4
* Human Growth and Development			x	3
				29

Total

LVN Credit Hours 35-39
RN Credit Hours 67-71

* Not required for the LVN

TABLE 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

COURSE DESCRIPTIONS
(Postsecondary Level)

NURSING PROCESS:

A 2 hour course focusing on theories of nursing practice, scope and standards of practice, beginning problem solving and the nursing process. Initial physical assessment, care planning, documentation, transcultural considerations, communication, and introductory patient teaching are included.
(1 hours lecture/3 hours lab per week)

NURSING: BASIC NEEDS Ia-Ib

A 6 hour course focusing on bio-psycho-social needs of medical-surgical patients focusing on all age groups. Emphasis is on application of the nursing process in a clinical setting for patients with needs relating to mobility, oxygenation, rest, bowel elimination, comfort, skin integrity, and safety. Discussion is conducted on surgical nursing. Principles of pharmacology, medication administration, and nutrition will be presented.
(3 hours lecture/9 hours lab per week)

NURSING: BASIC NEEDS II

(A continuation of Nursing: Basic Needs I)
A 6 hour course that applies to bio-psycho-social needs of patients in all age groups relating to circulation, physical regulation, sensation, perception, urinary elimination, fluid and electrolyte imbalance, and mental health. Focus is on applying theory of the nursing process to clinical problem solving. Emergency care is also included. Pharmacotherapy and nutrition are included with appropriate content.
(3 hours lecture/9 hours lab per week)

NURSING THROUGH THE LIFESPAN

A 6 hour course focusing on a nursing process approach to the bio-psycho-social needs of pediatric, adult and elderly patients, and families. Consideration is given to reproductive and obstetrical nursing. Alteration in health within the ages are includes.
(4 hours lecture/6 hours lab per week)

TABLE 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

NURSING: COMPLEX NEEDS I

An 7 hour course assisting the student in analysis and evaluation of the nursing process for patients with complex disorders in integumentary, respiratory, gastrointestinal, musculoskeletal, immune, and sensory systems. Decision making skills and clinical problem solving are emphasized. Psychosocial considerations, pharmacotherapy, nutrition, safety, and advance skills are included within the units. (4 hours lecture/12 hours lab per week)

NURSING: COMPLEX NEEDS II

(A continuation of Nursing: Complex Needs I)
An 7 hour course that includes concepts of advanced medical-surgical nursing. Complex needs of patients with disorders of cardiovascular, neurological, endocrine, obstetrical, renal, and multisystem disorders are presented. A nursing process approach and critical thinking skills are expected. Psychosocial considerations, pharmacotherapy, nutrition, and safety skills are included within the units.
(4 hours lecture/12 hours clinical per week)

ENTRY INTO VOCATIONAL PRACTICE:

Trends, issues, and ethical-legal issues are covered within this 4 hour course. Communication and management skills required of vocational nurses are discussed. The clinical component focuses on utilizing previous skills in the coordination and performance of patient care and nursing process at an application/analysis level.

(2 hours lecture/6 hours clinical per week)
* Course is require for students seeking to exit as an LVN.

ENTRY INTO PROFESSIONAL PRACTICE:

Trends, issues and ethical-legal concepts of professional nursing are covered within this 4 hour course. Consideration is given to leadership, team management, advanced communication, and patient teaching concepts utilized in the care of groups of patients. The clinical component focuses on analysis and evaluation of a nursing process approach to patient care.
(2 hours lecture/6 hours clinical per week)

TABLE 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

COURSE DESCRIPTIONS
(Secondary Level)

Grade 11 - Health Careers I

Course Description:

This is a one-year program that combines academic and clinical experience. Students will receive classroom instruction which includes lecture, classroom laboratory and individualized study, that focuses on the basic knowledge and skills of medical terminology, communication skills, ethical and legal issues, employment skills, safety and mobility, leadership and personal quality concepts and skills. Basic knowledge and skills in anatomy and physiology, first aid and emergency care, vital signs, infection control and asepsis, health career math and patient personal care skills are included. In addition the student will receive clinical experience in a licensed health care facility.

Students must complete this course to articulate to the next level in the 2+2 Articulated Health Occupations Program for the registered nurse.

A 12th grade student may enroll in this course, but would not be eligible to pursue the 2+2 Program for a registered nurse.

Table 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

Grade 12 - Health Career II

Course Description:

This is the second year of the 2+2 Articulated Health Occupations Program for registered nurses. Students must demonstrate mastery of the competencies taught in Grade 11 before enrolling in this course. This course will combine advanced academic and clinical experience in the areas of medical terminology, communication skills, health care history, safety and mobility, employment skills, and leadership concepts and skills. Also, anatomy and physiology, ethical-legal, first aid and emergency care, vital signs, infection control and asepsis, health career math, nutrition and patient personal care skills are included in preparation for entering the RN program at the postsecondary level.

Students will receive classroom instruction which includes lectures, classroom laboratory, and individualized study. In addition the student will receive clinical experience in a licensed health care facility.

Students may exit from the program at the end of the 12th grade and be eligible to take the state examination to become a nurse aide, providing the secondary health occupations program has been approved as a training program for nurse aide by the Texas Department of Health.

Upon completion of this course students may articulate to the postsecondary level for continued training as a registered nurse.

Table 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

Occupation: Licensed Vocational Nurse

Generic Job Description: Licenced Vocational Nurse

A Licensed Vocational Nurse performs nursing tasks for which specific skills have been developed. Nursing care is provided to patients under the direction of the Registered Nurse of physician. An LVN may perform delegated tasks independently based upon the level of competence. The LVN effectively communicates in interpersonal relationships with patients, families, and other members of the health care team. The nursing process is utilized as a basis for developing and implementing a goal-oriented plan of care. The LVN may perform other duties as directed by the employing institution's policies.

Curriculum Objective:

The curriculum is designed to produce an individual capable of using technical skills and providing bedside care for patients of all ages within the bounds of the Vocational Nurse Act. The curriculum will prepare students to sit for a National Council Licensure Examination for Practical Nurses.

Exit Point for LVN

Students may exit from the 2+2 Articulated Health Occupations Program to become a Licensed Vocational Nurse, by successfully completing the following courses and obtaining a passing score on the National Council Licensure Examination for Practical Nurses.

Table 4 (continued)

An Example of A 2+2 Articulated Curriculum For Nursing Education

Occupation: Nurse Aide

Job Description:

A Nurse Aide performs tasks involved in providing nursing and personal care to clients under the supervision of qualified nursing staff members. Emphasis is on maintenance of daily living activities of these clients.

Curriculum Objective:

To provide individuals with skills and knowledge to provide basic nursing care.

To provide the student with sufficient knowledge and skills to pass a manual skills and written examination administered by the Texas Department of Health for Registry as a Nurse Aide.

V

BASIC COURSE OUTLINES

As generally used a course of study is an organized body of instructional content necessary for the teaching of a particular subject. It is different from the curriculum by the fact that a curriculum includes a list of all the courses (of study) offered over a long period of time and required for mastery of a specified subject (eg. math, science) at an institutional level. A course of study should not be confused with a basic course outline. A course of study is a detailed plan of instruction which includes lesson plans, references, grading systems, and class management procedures. A basic course outline, which is more detailed than a topical course outline should include as a minimum:

- Name of program (curriculum)
- Objectives of the course
- A list of competencies to be developed by the course stated in performance terms.
- Instructional topics (task statements written as objectives in performance terms).
- Lists of learning activities
- List of tools, equipment and materials when appropriate
- References
- Procedures for evaluation of student progress
- Competency profiles and suggested criteria for measuring mastery of competencies

The main advantages of a basic course outline are:

1. It is easier to prepare than a course of study.
2. It serves as a guide for developing a course of study.
3. It gives the supervisor, other administrators, and members of the program advisory committee an immediate overall view of the course.
4. It becomes document for the administrators who wish to keep on file outlines of all courses.
5. It will serve as a guide for the instructor in assuring.

Both the Texas Higher Education Coordinating Board and the Texas Education Agency have specified that sponsored developmental 2+2 programs be competency-based. Therefore, it is necessary that the basic course outlines be developed to meet the competency-based specifications. Competency-based education is not a method or procedure for the delivery of instruction. Competency-based education is a system for ensuring that (1) what is taught is based on the competency requirements of the workplace and (2) the student's achievement is measured using performance criteria of the workplace.

The primary difference in competency-based education or competency-based instruction and other instruction is that in a competency-based system (1) the instructional content is based on the competencies of the workplace and (2) the evaluation of the instruction, in terms of student outcomes, is performance measured. The instruction delivery method(s) or learning activities will be selected by the instructor. The competency-based system does have specific characteristics that are related to instructional methodology. One of the characteristics of competency-based education is that the student is informed prior to instruction of (1) the competency to be mastered; (2) the conditions under which the competency will be performed; and (3) the criteria to be used in measuring the performance.

A. Objectives

The formulation of objectives for the basic course outline will be helpful in identifying the conditions that will prevail when the competency or task is demonstrated. Following is an example of how the objectives may be sequenced when preparing the basic course outline.

Competency	-	Terminal Performance Objective
Task	-	Performance Objective

Learning Activities - Enabling Objective
(Lesson or learning experience)

The enabling objectives may be written as a lesson objective or only as complete statements of skills, knowledge, or attitude necessary for the student to learn and successfully demonstrate performance of the task.

Performance objectives are written for the competencies and tasks that are to be developed by the course. A performance objective may be defined as:

A statement in precise measurable terms of a particular behavior to be exhibited by a learner under specified conditions. It contains each of the characteristics specified below:

1. Condition. The environment or situation in which the competency or task is to be performed is specified.
2. Performance. The specific competency, task or behavior expected of the learner is stated.
3. Standard. The degree of acceptable performance is specified. The standard is stated in quantitative terms, qualitative terms, or both. For the terminal performance objective (competency) or performance objective (task) the standard will be 100% of the evaluation criteria as established by the workplace.

In occupations requiring a high level of theory, enabling objectives may be written in performance terms. If the enabling objective is written in performance terms then 100 percent demonstration is assumed unless otherwise stated for the quantitative standard. If the standard is qualitative for the enabling objective, the standard is specifically stated as "75%" "90%" etc.

In the 2+2 RN curriculum the secondary instructor, as certified by the Texas Education Agency, will be charged with the verification of the cognitive competencies in grade 11 and 12, and the psychomotor (performance) competencies will be verified for mastery by the supervising RN in the clinical workplace.

The terminal objective (competency mastery) should be evaluated by a supervising practitioner from the workplace.

The project which developed the 2+2 articulated curriculum for registered nurses used a different sequencing of objectives. The competency to be mastered was not written as a performance objective. The mastery of the competency by each student will be evaluated by an occupational competency exam administered and evaluated by an approved supervising registered nurse during the clinical phase(s) of the instruction.

In the 2+2 RN project the tasks of the occupation were written as terminal performance objectives. Technical occupations often require a high proportion of theory (cognitive domain) for each skill (psychomotor domain) to be performed. When learning in the cognitive domain is greater than that of the psychomotor domain it is appropriate to include the cognitive instruction with the performance objectives rather than including them as enabling objectives.

Whether the performance objective is for the cognitive domain or the psychomotor domain the following points should be observed when writing performance objectives:

1. Use the competency or task statement as the base for the performance objective.
2. Include a condition, performance, and standard statement in each performance objective.
3. Include only one performance in the objective.
4. Write standards which are measurable.

5. Include only those conditions which are essential to the performance and can be provided during the evaluation.
6. Use an action verb that specifies the performance to be demonstrated.

Examples of performance objectives for nursing are shown below.

Cognitive Domain

Provided with instruction on the needs of the newborn, identify and discuss in writing the emotional, nutritional, and satisfy needs of the newborn. Successful achievement will be realized with a score of 85% on a written test.

Psychomotor Domain

Following instruction/demonstration by your instructor, provide safe nursing care to a postpartum maternity patient in the maternity ward. Acceptable nursing care will be demonstrated with a score of 100% on the Clinical Performance Rating Scale.

Examples of performance objectives and the format of the basic course outline for the course Health Careers I of the 2+2 project for registered nurses are shown as Figures 6 and 7.

COURSE: HEALTH CAREERS I

Unit: Medical Terminology

Terminal Performance Objective:

Given a list of prefixes, suffixes, and word roots the learner will demonstrate a knowledge of medical terminology at the nurse aide level and be able to demonstrate mastery on the knowledge test with an 85% accuracy.

Enabling Objectives:

The learner will:
1. Memorize medical terminology including root words, prefixes, and suffixes
2. Give the meaning of root words
3. Recognize medical prefixes
4. Give the meanings of medical suffixes

TEACHING METHODS:

(X) LECTURE

( ) LABORATORY

(X) AUDIO-VISUAL

( ) CLINICAL

REFERENCES:

DHO text, pp. 129 - 132
DHO workbook pp. 72 -75
HOE Curriculum Guide I, p. 83 for suggested references

EQUIPMENT/SUPPLIES:

Flash cards
List of words
Textbooks and workbooks
Computer software
Med. Term, Tapes and tape player
Computer

EVALUATION:

( ) PERFORMANCE TEST
(X) KNOWLEDGE TEST

Figure 6

COURSE: Health Careers II

Unit: Personal Care Skills

Terminal Performance Objective:

Given tests, references, clinical experiences and proper equipment, the leaner will demonstrate the proper procedure for sterilizing equipment and supplies and achieve 100% mastery on the performance test.

Enabling Objective(s)

The learner will:

1. Wash hands according to aseptic technique.
2. Wash, wrap and autoclave equipment and supplies following proper procedure.
3. Follow directions for specific autoclaves and agency policy for sterilizing supplies.
4. Identify safety precautions for sterilizing procedures.

TEACHING METHODS:

(X) LECTURE

( ) LABORATORY

(X) AUDIO-VISUAL

(X) CLINICAL

REFERENCES: Diversified Health Occupations
Simplified Nursing
Being a Nursing Assistant

EQUIPMENT/SUPPLIES: Autoclave
Instruments
Wrap
Indicator Tape

EVALUATION: (X) PERFORMANCE TEST
( ) KNOWLEDGE TEST

Figure 7

The developers of the basic course outlines for the 2+2 project divided the instructional content of the course into units of instruction. The units were created by clustering all of the tasks, related information, learning activities, into a unit of instruction. It is recommended that consideration be given to using the term "instructional competency" instead of the term "instructional unit." If the change creates a problem for developers of instructional materials, then the competency to be developed must be used for the title of the instructional unit as shown in figures 6 and 7.

B. Learning Activities/Events

A 2+2 articulated curriculum or a competency-based education program does not change nor reduce the need for a variety of successful instructional methods or strategies. Whether the instruction is delivered to a large group, small group, or individual, the instructional methods used depends on the course content, student population, facilities, instructor's ability, and the availability of appropriate instructional materials.

When writing the learning activities/events for the basic course outline the writer must keep in mind the sequence in which the learning activities are identified.

The competency to be developed and mastered by the student must serve as the based for which the learning activities are identified or developed. The following example of the sequence which must be observed was taken from the format used for the Performance-Based Teacher Education project conducted by the National Center for Vocational Education, Ohio State University, Columbus, Ohio.

Terminal Performance Objective (competency)
Performance Objectives (tasks)
Enabling objectives:

Enabling objective 1	Lesson 1 or Learning Activity 1
Enabling objective 2	Lesson 2 or Learning Activity 2
Enabling objective 3	Lesson 3 or Learning Activity 3

The performance objectives are the tasks stated in behavioral (performance) terms. The enabling objectives (required learning activities) were identified by the analysis of each of the tasks of the competency. Each enabling objective or learning activity may require a different teaching or instructional method. The most appropriate instructional method, for each enabling objective, should be listed in the basic course outline. Following are brief descriptions of instructional methods that have been proved as successful in vocational and technical education.

1. Lecture and Laboratory Instruction. The course content is divided into a series of competencies or units of instruction. Group discussions and lectures provide content involving cognitive skills and information concerning job procedures, safety, and technique. The psychomotor or application of skills is taught in the laboratory or shop. Students progress through the program as a group. Some independent and individualized instruction may be used.

2. Learning Activity Packages (LAP). The LAP system of instruction divides the course content into a series of individual learning packages which include one or several competencies. The learning activity package usually contains a pretest, performance objective(s) learning activities, self-checks, and a posttest. Students progress at their own rate, and instruction can be tailored to fit individual needs. LAPS may also be used in a group instruction format.

3. Competency Sheets. A method which assists the vocational instructor in organizing learning and evaluation activities. The competency sheet is similar to a job sheet. The following components are included on competency sheets: (1) competency statement, (2) performance objective, (3) enabling objectives, (4) learning activities, (5) evaluation techniques, and (6) criterion-referenced materials. The competency sheets assist the teacher in providing individualized programs for students, allow for self-pacing, and organize various instructional materials and activities.

4. Task or Operation Sheets. A method of instruction which provides specific information for the student on how to complete a task or skill required in the vocational program. Competencies requiring "hand-on" skill usually are taught in the laboratory environment, and a task sheet facilitates this type of instruction. Task sheets may include (1) task or skill to be performed, (2) material required, (3) tools and equipment needed, (4) procedure or operations, (5) safety considerations, and (6) evaluation information. Normally, task sheets are used with other methods of instruction in vocational programs.

5. Modules. A self-contained unit or package including information, learning activities, and evaluation required to learn a specific competency or unit of instruction. Modules allow for self-pacing and individualization of programs. A vocational program using modules or self-contained packages as the major instructional method is called a "modularized" course. Modules are available for most vocational programs or courses.

6. Programmed Instruction. An auto-instructional method in which subject matter is arranged into a series of small steps. Cognitive information is structured into a series of frames or steps with answers. The student works through the program by responding to the questions. Immediate feedback and reinforcement is provided to the students. Program booklets are either "linear" or "branched", depending on the subject matter and complexity of the programs.

7. Individualized Learning. A method which assesses the student prior to learning and adjusts the program to fit the student's needs. A variety of learning materials and methods are used to meet individual learning styles. Self-pacing and the use of modules or learning activity packages usually are in individualized vocational programs. Because individualized instruction varies among programs and educators do not agree on definitions, there may be other characteristics.

8. Simulations. A technique which uses a role-playing model to teach competencies that are required in real-life situations. There are various types of simulation: simulation games, task simulation, position (job) simulation, and model office (flow-of-work) simulations. This instructional method serves as a motivational device and can help students develop a sense of responsibility toward work. In other words, simulations enable the student to experience situations which are required in the real world setting.

Each of the enabling objectives listed in the basic course outline should result in a lesson plan being developed and used if the instructor is not using learning activity packages, modularized instruction, or programmed instruction. The lesson plan is actually a road map for the student and teacher in providing detailed information concerning content, learning activities, procedures, materials required, references, presentation techniques, and evaluation procedures. The plan is valuable also to the vocational supervisor and administrator in evaluating the programs and providing assistance to the teacher. Lesson plans are designed and developed for the following reasons:

a. Organized and coordinates content and instruction.
b. Presents a logical sequence to instruction.
c. Provides a listing a instructional materials and aids.
d. Provides a basis for program planning and evaluation.
e. Causes teachers to analyze and plan content prior to instruction.
f. Provides a record of actual course content and emphasis.

C. Tools and Equipment

The listing of tools, equipment, and supplies is a requirement for each enabling objective. The list of tools and equipment needed for the course(s) was developed from the analysis of the tasks. Tools and equipment for the instructional program must be comparable to that of the workplace. The list of tools and equipment prepared for the course or program should be approved by the program advisory committee. Also the tools and equipment should exceed those required by licensing or certification agencies. A complete list should be compiled to assure that the tools and equipment will be available when needed. An example of lists of tools and equipment prepared for the 2+2 RN project are on the following pages presented as Tables 5 and 6.

Table 5

Secondary Health Careers
Supplies and Equipment
for
Registered Nurse Program

Laboratory Equipment

Quantity	Description	Cost
2 each	Electric hospital beds with side rails	1,411
6 each	Stethoscopes, Dual-head	24
8 each	Sphygomomanometers	41
2 each	Overbed tables	129
2 each	Bedside cabinet	185
6 each	Thermometers	15
3 each	Electronic thermometers	367
1 each	Resusci - Annie (complete)	760
1 each	Resusci - child	400
1 each	Resusci - baby	500
1 each	Chris - clean (complete)	700
2 each	Teaching stethoscopes	18
3 each	Microscopes with slides	200
3 each	Stop watches	40
6 each	Food trays	3.25 each set
6 sets	Silverware	20
6 each	Plates	24
4 each	Bed pans, adult	9 each

Table 5 (continued)

Supplies

Quantity	Description	Cost
8 each	Fitted Sheets	
8 each	Top Sheets	
8 each	Pillow Cases	
8 each	Draw Sheets	
8 each	Bedspreads	
8 each	Blankets	
2 each	Pillows	
8 each	Towels and washclothes	
8 each	Bath blankets	
	Total	800
8 each	Water pitchers and glasses	20
4 each	Wash basins, autoclavable, polypropylene, 5 qt	105
4 case	Emesis basisns, 500 cc polypropylene	16
4 case	Urinials, polypropylene	38
1 case	Marks, P.F. 24, The Classic	64
1 case	Gloves, latex, exam, med.	22
1 case	Disposable gowns, full back	119
4 kits	Air Flate Splints	55.50
12 each	Cravets triangular bandages	1.50
1 box	4 X 4 flats	4
1 box	2 X 2 flats	2
1 case	Tape (assorted sizes)	48
2 case	2" gauze	18
2 case	1" gauze	13
2 case	4" gauze	24

Table 5 (continued)

Classroom Equipment

Quantity	Description	Cost
25	Student desks	71
1	Teacher desk	261
1	Teacher chair with casters	64
1	Podium	57
1	Non-chalk whiteboard (4' x 6')	115
1	Bulletin Board (4' x 6')	114
1	Wall mounted soap dispensers	7
1	Cabinet (storage) 65" x 37" x 25"	600
1	Wardrobe cabinet (closed base model)	700
1	Table for microscopes (science table)	181
7	Computers and word processors with printers	3,000 each
1	Television 20" color	800
1	VCR	600
1	Cart	160
1	Slide projector (kodak 5600)	665
1	Filmstrip projector (micromatic II w/remote control)	540
1	16 mm projector	1,500
1	Projector cart	160
1	Overhead projector	262
2	Open shelves for books and references	467
1	Paper towel dispenser	29
1	Tape recorder and player	50
1	Typewriter	1,000
3	Four drawer file cabinet	270

Table 6

Postsecondary Supplies and Equipment
for Registered Nurse Program

Equipment		Unit Price
4 each	Electric hospital bed (equipped)	1,550
2 each	Full body training mannequin with part	3,000
1 each	CPR mannequin - adult	1,200
1 each	CPR mannequin - child	250
1 each	CPR mannequin - infant	400
1 each	Surgical mannequin	500
1 each	Catheter mannequin (male)	3.50
1 each	Catheter mannequin (female)	3.50
4 each	Bedside cabinets	185
4 each	Overbed tables	195
4 each	Bedside chairs	31
1 set	Mannequin - body parts	1,500
1 each	Enema Simulator	350
1 each	Laryngoscope and blades	200
1 each	Doppler	700
1 each	Papoose Board	300
1 each	Forcepts (assorted types)	500
1 each	Dysrythmia simulator/oscilloscope	6,600
1 each	Crash Cart	600
1 each	Otoscope/opthalmoscope	350
1 each	Scale (adult)	275
1 each	Scale (infant)	190
1 each	Rolling IV stand	123
1 each	Breast self-exam mannequin	200
4 each	Bedpans	12
4 each	Urinals	6
1 each	Traction frame with trapeze, weights and holders bucks, skinner pin	1,500
1 each	Thompson splint/person attachment	300
1 each	Airways, oral, nasal, EOA, ET	150
1 each	Wrist retraints	20
1 each	Posey Vest	20
1 each	Ostomy Training Mannequin	400
1 each	Ostomy Equipment	150
1 each	Specimen collection containers	70
1 each	Wheelchair	500
1 each	Gurney/litter	3,500
1 each	Linen hamper	150
1 each	NG tubes/salem sump, levin, miller-abbott, sengstaken-blakemore, dobboff	70
2 each	LVAC thermometer	600

Table 6 (continued)

Postsecondary Supplies and Equipment
for Registered Nurse Program

Equipment		Unit Price
20 each	Glass thermometer	20
1 each	O_2 Set-ups	250
1 each	Medicine cart	800
1 each	Injection mannequin	350
1 each	Charts-body function	500
1 each	OB phantom/skeleton	650
1 each	Glucometer and sticks	120
1 each	Suction kits with components	350
	Infant care doll	100
	Trach care kits	66
	Trach tubes	40
	Oxygen tank and holder	200
	CVP mariometer	50
	Linens-sheets, pillows, pillowcases, towels, washcloths	2,000
	Wall O_2 suction outlets	800
	Suction units	600
	B/P cuffs wall (4)	200
	B/P cuffs rolling (2)	250
	Gcomco	1,100
	IV catheters	75
	IV Bap	150
	IV Arm	350
	IV Tubing	100
	Chest tube bottles and plevravac	400
	TROCAR	50
	IV pump	1,800
	Ace wraps	16
	Binders	15
	Ted hose	40
	Trays	40
	Graduate cylinders	30
	Ambu bags	200
	Chest tubes clamps	20
	Hemostats	15
	Sterile towels	60
	A-V media for resource center	40,000

Table 6 (continued)

Supplies

Dressing supplies, gaze, telfa, tape, etc.	200
Sterile gloves	200
Examination gloves	15
Surgical scrub packs	69
Toothette	30
Glycerine swabs	20
Alcohol swabs	100
Syringes/needles (assorted sizes)	200
Sterile gowns	300
Masks	50
Shoe covers	50
Caps	50
Ampules	100
Tubex	100
Vitals	100

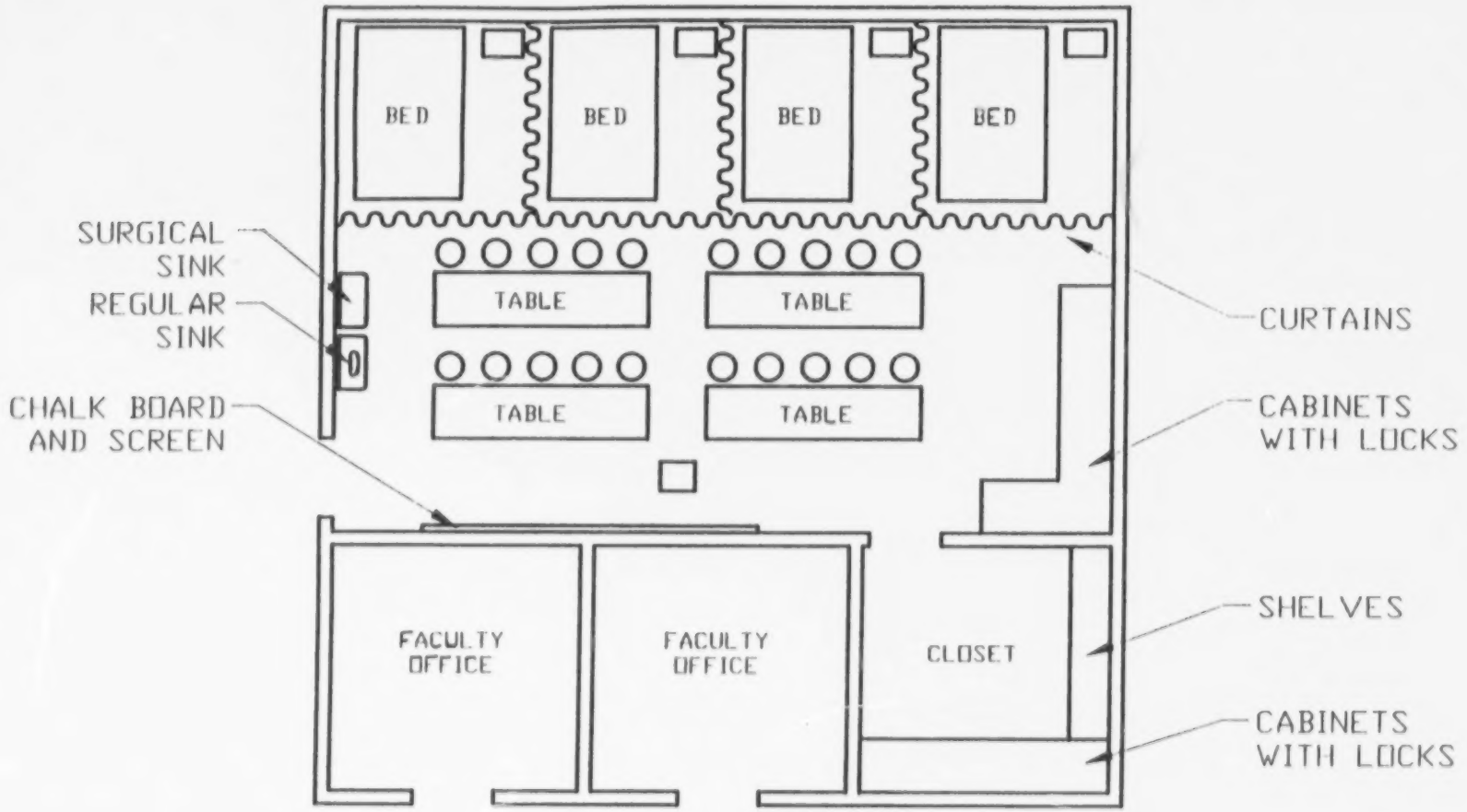
Table 6 (continued)

Classroom Equipment

Quantity	Description	Cost
25	Student desks	71
1	Teacher desk	261
1	Teacher chair with casters	64
1	Podium	57
1	Non-chalk whiteboard (4' x 6')	115
1	Bulletin Board (4' x 6')	114
1	Wall mounted soap dispensers	7
1	Cabinet (storage) 65" x 37" x 25"	600
1	Wardrobe cabinet (closed base model)	700
1	Table for microscopes (science table)	181
7	Computers and word processors with printers	3,000 each
1	Television 20" color	800
1	VCR	600
1	Cart	160
1	Slide projector (kodak 5600)	665
1	Filmstrip projector (micromatic II w/remote control)	540
1	16 mm projector	1,500
1	Projector cart	160
1	Overhead projector	262
2	Open shelves for books and references	467
1	Paper towel dispenser	29
1	Tape recorder and player	50
1	Typewriter	1,000
3	Four drawer file cabinet	270

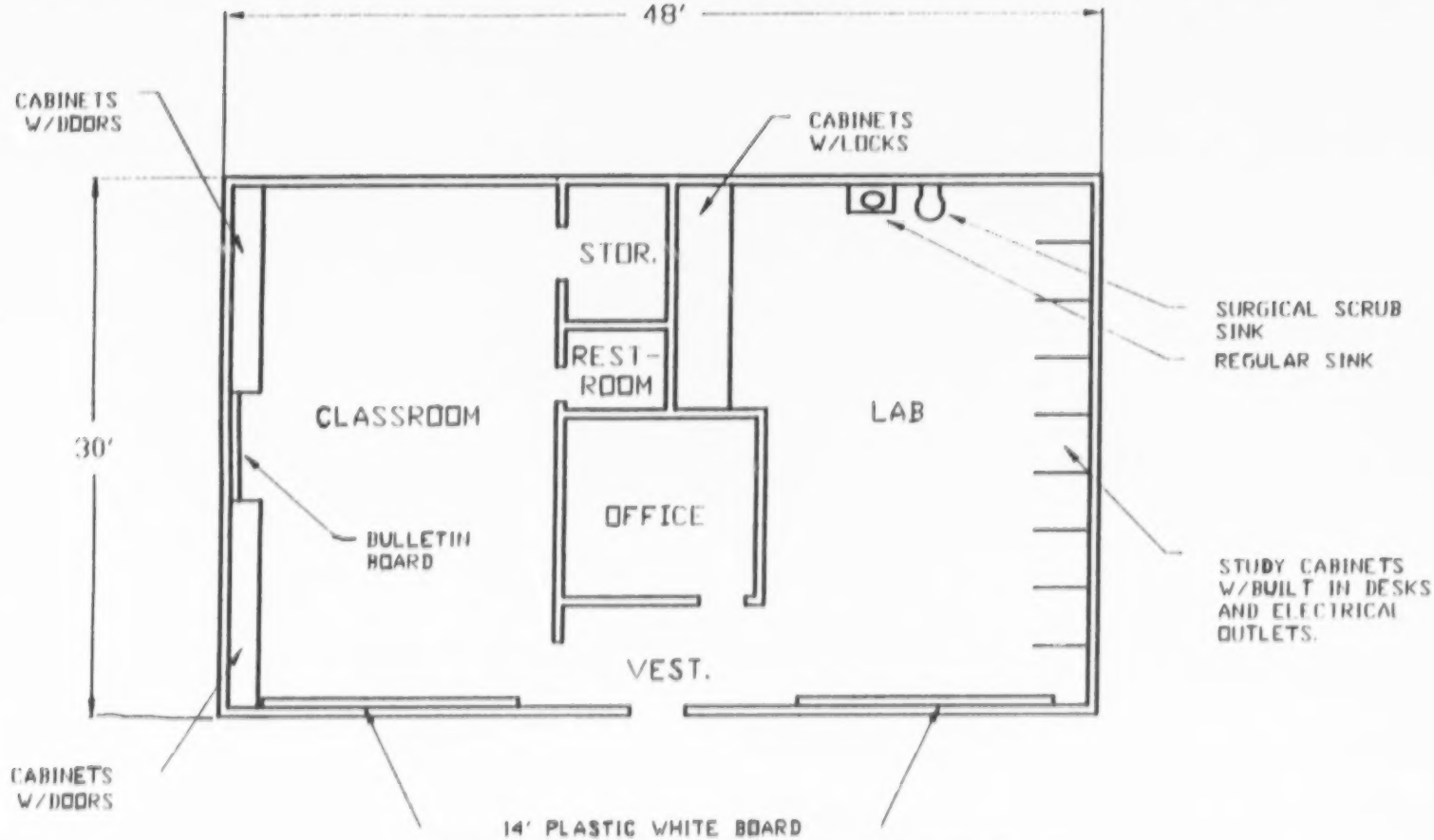
D. Physical Facilities

Adequate physical facilities must be available for the instructional program. Both a line drawing and narrative specifications should be prepared for the physical facility. The line drawing and specifications of the physical facility should be approved by the appropriate state education agency. In the case of a 2+2 both the Texas Higher Education Coordinating Board and the Texas Education Agency should approve the physical facility. The physical facility for the 2+2 RN program must also be approved by the respective licensing boards or certifying authority. Examples of the line drawings for the 2+2 RN program are shown as figures 8 and 9.



RECOMMENDED INSTRUCTIONAL FACILITY
FOR POST SECONDARY HEALTH PROGRAM

FIGURE 8



RECOMMENDED INSTRUCTIONAL FACILITY
FOR SECONDARY HEALTH PROGRAM

FIGURE 9

E. Instructional Materials

Since the basic course outline serves as a guide for the development of a complete course of study, a course syllabus, and lesson plans it is necessary that examples of instructional materials be listed in the basic course outline with a bibliography at the end of the outline. Since the developers of the basic course outlines will list only the materials with which they are most familiar, instructors using the basic course outlines should search all available sources before deciding on materials to be used.

There are numerous curriculum materials development centers which offer a variety of curriculum materials such as task lists, learning activity packages, transparencies, competency sheets, task sheets, information, sheets, and testing materials. Following is a partial list of organizations that should be contacted to obtain a instructional materials catalog:

California State Department of Education
721 Capitol Mall
Sacramento, California 95814

Curriculum Materials Service
Department of Vocational Education
Colorado State University
Vocational Education Building
Fort Collins, Colorado 80523

Career Education Center
415 North Monroe Street
Tallahassee, Florida 32306

American Association for Vocational Instructional Materials
Engineering Center
Athens, Georgia 30602

Iowa Association for Vocational Instructional Materials
Agricultural Engineering Department
Iowa State University
Ames, Iowa 50010

Kansas Vocational and Technical Curriculum Center
Kansas State College of Pittsburgh
Pittsburgh, Kansas 66762

Curriculum Development Center
Taylor Education Building, Room 151
University of Kentucky
Lexington, Kentucky 40506

Vocational Curriculum Development and Research Center
P.O. Box 657
Natchitoches, Louisiana 71457

The Center for Vocational Education
Curriculum Materials Development
628 Aderhold Hall
University of Georgia
Athens, Georgia 30602

Illinois Curriculum Management Center
Division of Vocational and Technical Education
1035 Outer Park Drive, Suite 201
Springfield, Illinois 62706

Instructional Materials Laboratory
School of Technology
Indiana State University
Terre Haute, Indiana 47800

Minnesota Instructional Materials Center
3300 Century Avenue North
White Bear Lake, Minnesota 55110

Research and Curriculum Coordinating Unit
Mississippi State University
P.O. Drawer DX
State College, Mississippi 39762

Instructional Materials Laboratory
8 Industrial Ed., University of Missouri
Columbia, Missouri 65201

Vocational-Technical Curriculum Laboratory
Rutgers University
Building 4103 - Kilmer Campus
New Brunswick, New Jersey 08903

Vocational Instruction Unit
New Mexico State Department of Education
Education Building
Education Building
Sante Fe, New Mexico 87503

Institute for Occupational Education
Cornell University
Stone Hall
Ithaca, New York 14840

Vocational Curriculum Research & Development Center
Department of Industrial Education
University of Maryland
College Park, Maryland 20742

Technical Education Research Center
44 Brattle Street
Cambridge, Massachusetts 02138

Massachusetts Center for Occupational Education
Two Sun Life Park, 100 Worcester Street
Wellesley Hills, Massachusetts 02181

Curriculum and Instructional Materials Center
State Department of Vocational and Technical Education
1515 West Sixth Avenue
Stillwater, Oklahoma 74074

Continuing Education Publications
Extension Annex
Corvallis, Oregon 97331

Vocational Education Resource Center
Regional Office of Education
Box 729
Hato Rey, Puerto Rico 00917

Vocational Education Media Center
Clemson University
Freemen Hall
Clemson, South Carolina 29631

Vocational Curriculum Laboratory
State of Tennessee
Department of Education
P.O. Box 1114
Murfressboro, Tennessee 37130

Instructional Materials Center
Division of Extension
The University of Texas at Austin
Austin, Texas 78712

The Center for Occupational Education
North Carolina State University
Raleigh, North Carolina 27607

The Center for Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
1885 Neil Avenue
Columbus, Ohio 43210

Vocational Instructional Services
Vocational-Industrial Education Department
Texas A & M University
College Station, Texas 77843

Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271

East Texas Curriculum Center
East Texas State University
P.O. Box 3011
ET Station
Commerce, Texas 75428-7011

A network of clearinghouses has been established by the National Institute of Education to collect, select, and catalog educational materials and literature. The network, Educational Resource Information Center (ERIC), provides both hard copies and film copies of cataloged documents. Instructors and administrators should check with their local librarians for additional information concerning ERIC services and materials. The following clearinghouses have been established:

ERIC Clearinghouse in Career Education
The Center for Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

ERIC Clearinghouse on Adult Education and Lifelong Learning
204 Gabel Hall
Northern Illinois University
DeKalb, Illinois 60115

ERIC Clearinghouse on Early Childhood Education
College of Education
University of Illinois
805 West Pennsylvania Avenue
Urbana, Illinois 61801

ERIC Clearinghouse for Reading and Communication Skills
National Council of Teachers on English
1111 Kenyon Road
Urbana, Illinois 61801

ERIC Clearinghouse on Rural Education and Small Schools
New Mexico State University
Box 3AP
Las Cruces, New Mexico 8003

ERIC Clearinghouse on Science, Mathematics and Environmental Education
The Ohio State University
1800 Cannon Drive
400 Lincoln Tower
Columbus, Ohio 43210

ERIC Clearinghouse on Educational Management
University of Oregon
Eugene, Oregon 97403

ERIC Clearinghouse on Handicapped and Gifted Children
Council for Exceptional Children
1920 Association Drive
Reston, Virginia 22091

ERIC Clearinghouse on Higher Education
George Washington University
One Dupont Circle, Suite 630
Washington, D.C. 20036

ERIC Clearing on Information Resources
Stanford University
School of Education
Center for Research and Development in Teaching
Stanford, California 94305

ERIC Clearinghouse for Junior Colleges
University of California
Powell Library, Room 96
405 Hilgard Avenue
Los Angeles, California 90024

ERIC Clearinghouse on Language and Linguistics
Center for Applied Linguistics
1611 North Kent Street
Arlington, Virginia 22209

ERIC Clearinghouse for Social Studies Social Science Education
855 Broadway Street
Boulder, Colorado 80302

ERIC Clearinghouse on Teacher Education
American Association of Colleges for Teacher Education
One Dupont Circle, Suite 616
Washington, D.C. 20036

ERIC Clearinghouse on Tests, Measurements, and Evaluation
Educational Testing Service
Princeton, New Jersey 08540

ERIC Clearinghouse on Urban Education
Columbia University, Teachers College
Box 40
525 West 120th Street
New York, New York 10027

Educational Resources Information Center
Central Office
National Institute of Education
Washington, D.C. 20208

ERIC Processing and Reference Facility
4833 Rugby Avenue, Suite 303
Bethesda, Maryland 20014

ERIC Document Reproduction Service
P.O. Box 190
Arlington, Virginia 22210

The U. S. Department of Education has established a nationwide network of curriculum management centers for providing a means of collecting and sharing curriculum development information and materials. The purpose of this management system is to eliminate the costly duplication of effort in curriculum development.

The network is divided into regions and meet periodically to discuss curriculum activities and the development of products:

1. Northeast Curriculum Coordination
   Bureau of Occupational Research
   Division of Vocational Education
   225 West State
   Trenton, New Jersey 08625

2. Southeast Curriculum Coordination Center
   Mississippi State University
   Research and Curriculum Unit
   Drawer JW
   Mississippi State, Mississippi 39762

3. East Central Curriculum Management Center
   Illinois Vocational Curriculum Center
   Sangamon State University
   Springfield, Illinois 62708

4. Midwest Curriculum Coordination Center
   Oklahoma State Department of Vocational & Technical Education
   1515 West 6th Avenue
   Stillwater, Oklahoma 74074

5. Northwestern Curriculum Coordination Center
   Washington State Coordination Connell
   222 Airdustrial Park/Box 17
   Olympia, Washington 98504

6. Western Curriculum Coordination Center
   Vocational Education Section
   Department of Education
   721 Capital Mall
   Sacramento, California 95814

F. Competency Profiles

The specific meaning of the term "competency profile" is as evasive as the specific meaning of the term "competency." There are numerous competency profile models and formats available for vocational and technical programs. Therefore, it is suggested that developers of competency-based education programs determine the purpose for which the competency profile will be used.

Is the competency profile to serve as a record of the competencies mastered by the student which will (1) be reviewed by potential employers and/or (2) in the case of a 2+2 program be reviewed by the appropriate staff of the postsecondary institution to determine the student's achievement in the curriculum?

Will the competency profile be used to determined the progress of a student in a specific course?

Will the competency profile include a record of both competencies and tasks mastered?

Will the competency profile be used to record mastery of competencies for a course or for the complete 2+2 curriculum (program)?

Will the format or the size of the competency profile be compatible with the present filing and record systems?

In reference to the examination of student instructional needs in relation to the state's occupational and skill requirements the current Texas State Plan for Federal Vocational Education Funding states in 1.19; "These competency profiles are derived from a task listing of the occupation for which training is offered, validated by representatives of the appropriate business or industry".

One definition of a profile given in *Webster's New Collegiate Dictionary* is "a graph representing the extent to which an individual exhibits trails or abilities as determined by tests or ratings." This definition could be restructured to define a competency profile as a graph representing the extent to which a student has mastered the competencies of an occupation as determined performance exams. It is a rule of the Texas State Board of Education that:

> A competency profile shall be maintained on each student enrolled. Competency profiles for students in vocational education course, other than grades 11 and 12 occupationally specific courses, shall be defined as evidence of the essential elements.

Using the definition of Webster cited above, this rule could be interpreted to mean that the competency profile for students in vocational programs in grades 10 and below would represent the extent to which the a student had mastered the essential elements of a specific course as determined by test or other ratings approved by the local school.

By deduction the rule could also be interpreted to mean that the competency profile for students in grades 11 and 12 enrolled in occupational specific courses would represent the extent to which the student had mastered the competencies of the occupation for which he/she was preparing as determined by performance exams. This interpretation of the rule for competency profiles for occupational specific courses would imply that (1) the competencies on the profile would be specified by the workplace and (2) the criteria and measures for evaluating the performance exams would be determined by the workplace.

Regardless of the purpose or the format of the competency profile, space should be provide to record the date on which each competency was mastered and the name of the individual attesting to the mastery of the competency. Documentation of mastery of competencies is discussed in the section "Criteria for Process and Performance Exams." An example of a format for a competency profile is shown in Figure 10. One of the competency profiles developed by the 2+2 RN program is shown in Figure 11.

G. Student Monitoring

Findings from the review of the literature imply that student monitoring, related to instruction, is a process of assessing and recording student progress in a specific course or curriculum. A true manageable competency profile is of no more value to monitoring student progress in a course than is a transcript of the student's educational achievements.

In a true competency-based education program, which is open entry - open exit without time limitations, a student does not fail. In a true competency-based program there are two indicators of progress. One indicator is incomplete and the other indicator is complete.

In our public educational structure instruction is provided in semester time periods with semester hour credit being awarded based on the number of clock hours of instruction provided during the semester time frame. Therefore, individuals who do not achieve at a rate of learning established as a minimum for all students during the semester are considered to have failed. This system prevents the use of a true competency profile for a daily, weekly, or semester monitoring of a student's progress. Monitoring of a student's progress may be done in a variety of ways. Recording of student progress in our educational system is done by grades whether they be a numerical or letter grade.

EXAMPLE OF FORMAT FOR A COMPETENCY PROFILE

Name of Curriculum _____ Name of Student _____

Name of Occupation(s) _____ Student I.D. # _____

Comp. No.	Competency Statement	Date of Mastery	Name of Examiner	Comp. No.	Competency Statement	Date of Mastery	Name of Examiner

Signature of Secondary Instructor _____ Signature of Postsecondary Instructor _____

Figure 10

Student Competency Profile for Health Careers II (Grade 12) (Nursing Program)

A (✓) in the parenthesis beside each competency indicates mastery.

I. MEDICAL TERMINOLOGY

( ) Medical terminology of body system and speciality area of nursing practice

II. ANATOMY AND PHYSIOLOGY

( ) Identify simple anatomy, physiology and pathophysiology of the following body systems

( ) Digestive
( ) Urinary
( ) Endocrine
( ) Reproductive
( ) Nervous/special senses

( ) Identify anatomy pertaining to pregnancy and childbirth

III. HEALTH CARE PAST AND PRESENT

( ) Support philosophies of health care

IV. COMMUNICATION SKILLS

( ) Complete inter-departmental requisitions

) Disseminate reports to appropriate units

( ) Effective modes of communication with patients having difficulty

( ) Translate medical terms into a language that a patient can understand

V. ETHICAL-LEGAL

( ) Methods to prevent exposing self and others to legal problems

( ) Report questionable activities of self and others to supervisors

( ) Define legal terminology specific to health care

( ) Ethical/moral and cultural idealogies common in today's society

VI. FIRST AID AND EMERGENCY CARE

( ) BCLS re-certification AHA course "C" standards

( ) Provide emergency care for trauma of all body systems

( ) Perform head to toe patient assessment

VII. VITAL SIGNS

( ) Report vital signs that are significant to disease process or deteriorating condition

( ) Demonstrate repetition of vital signs that are questionable or abnormal

VIII. INFECTION CONTROL AND ASEPSIS

( ) Communicate terms related to asepsis

( ) Identify defense mechanisms against disease

( ) Categorize infections agents and their modes of transmission

( ) Utilize procedures for infection control

( ) Verbalize the rules of sterile techniques

( ) Apply sterile gloves and gowns according to surgical technique

IX. SAFETY AND MOBILITY

( ) Care for patient during seizure

( ) Administer range of motion

( ) Assist with walking with support devices

X. HEALTH CAREER MATH

( ) Convert English and metric measurements

XI. NUTRITION

( ) Identify common diets related to alterations in health

XII. PERSONAL CARE SKILLS

( ) Operate special beds

( ) Inventory patient's possessions

( ) Store patient's possessions in safe

( ) Demonstrate patient restraint methods curing nursing procedure

( ) Administer post-operative care

( ) Administer enemas

( ) Prepare skin for aseptic techniques

( ) Utilize hot/cold therapies

( ) Give ostomy care

( ) Insert rectal tubes

( ) Admit and discharge patient

( ) Sterilize equipment/supplies

( ) Perform beginning assessment skills

Figure 11 (continued)

Local boards of educational institutions (public schools and community/junior colleges) establish the grading system of the institution. Therefore, any proposed system for monitoring student progress in competency attainment which is converted to a grade must be based on local requirements.

Monitoring the daily, monthly, or semester progress of a student may be done using a variety of methods or techniques. Methods of monitoring student progress include measuring achievement of daily assignments, projects, periodic tests, and semester exams. Each of these methods usually are recorded by the assignment of a grade representing the degree of the student's process or achievement. Many vocational and technical education instructors use a student progress chart or profile that graphically presents the students progress to the student and instructor but does not have a grade on the chart. The progress chart used in vocational and technical education was probably the prototype of what is now called a competency profile.

The progress chart, similar in format to what is referred to as a competency profile, includes each task or performance objective of the course. As each student completes a required task or performance objective the date on which the task or performance objective was achieved would be recorded on the progress chart. The progress chart is not to be used as a grade record but as a graphic presentation to the instructor and student of the student's progress.

Recording the monitoring of progress and achievement of students in a public educational institution results in a grade. Based on the findings of research conducted by this 2+2 developmental project it would be unfair to base a student's grade based on

mastery of competencies. Employers were surveyed as to how the results of a competency exam would be reported. The consensus of the employers surveyed was that the rating would be a pass or fail. The pass or fail rating, which would have to be converted to a grade at the educational institution, does not take into consideration variables used by public education in determining course grades.

Since grading cannot be based on the mastery of competencies alone in the public education system, each school or college implementing a competency-based education system must develop its own student monitoring and reporting system.

Several states have developed systems for recording competency achievement or grading of competency-based education. The State of Virginia has developed a system which includes characteristics that are most common to all of the other systems reviewed. Following are excerpts from a document published by the Department of Education, Vocational and Adult Education, Commonwealth of Virginia which describes components of a grading system for competency-based education. In order to avoid confusion it is recommended that when reading the excerpts the word "task" be substituted for the word "competency."

(excerpt from *Trade and Industrial Education Service Area Resource*, Commonwealth of Virginia)

It is generally agreed that grading each competency should go beyond the pass-fail stage and should include an indication of the degree of skill the student has demonstrated. In addition, the grade may be based on more than just the performance (psychomotor) level and include the knowledge (cognitive) and personal behavior (affective) areas. The time required by a student to reach a specific performance level should not be considered in rating a student.

Grades from any system will, of course, need to be converted to the conventional A, B, C, D, F system for reporting of grades. The grade for each individual competency must, though, be retained in a student file for use by employers, etc.

Passing (or failing) grades for a course can be accomplished in several ways, such as establishing a minimum number of competencies which must be mastered fully, the number of competencies mastered, or averaging of the scores on only those competencies actually mastered.

CHARACTERISTICS OF GRADE SYSTEMS FOR CBE

1. Each student should be graded on his or her own level of achievement and not in comparison to other students.
2. The minimum acceptable level of achievement should be based on the minimum entry level in the industry or trade.
3. The grading system should be based on nonpunitive strategies. Grades for competencies achieved should not be lowered by competencies not achieved.
4. The system should provide recognition for achievement beyond the minimum level.
5. In an articulated program, both secondary and post-secondary instructors must agree on the same criteria or standards to be achieved for each competency.
6. The evaluation system (letter grade, points, etc.) must be related to the competency criteria standard. For example, the terms excellent, good, average for the letter grades A, B, C should not be used.

7. The grading composition (e.g., percentage for attendance, attitude, etc.) must be made known to the student. It is suggested that three grades be given--one for performance, one for attendance/attitudes, and one for technical knowledge.

8. A minimum number of competencies should be equated to different letter grades. For example, a student receiving an A grade must have achieved 90 percent of the competencies for the occupation.

9. The time required for a student to master a competency should not be considered in rating a student, except as reflected in #8, above.

10. Letter grades should not be placed on competency sheets, but on the official transcript.

11. A point system should be used for all competency-based courses. This allows for a standard grade translation.

PSYCHOMOTOR GRADING

4, 3, 2, 1, 0 System

This system is the most widely used and is recommended since it easily converts to the A, B, C, D, F and decimal systems, A being 4 and F being 0. An average of 3.7 would be a grade of 94.25 percent, etc.

4 - Highly proficient: The student can complete task quickly and accurately, can direct others in how to do task, and needs only normal supervision.

3 - Competent: The student can complete all parts of the task, needs only a spot check of completed work, meets minimum entry level requirements, and needs job entry supervision.

2 - Partially proficient: The student can complete most parts of the task, needs help only on hardest parts, may not meet all job-entry level requirements for speed and accuracy, and needs close supervision.

1 - Extremely limited: The student can complete simple parts of task, needs to be told or shown how to do most of task, and needs extremely close supervision.

0 - The student cannot perform any part of task at a level sufficient for participation in a work environment.

X - The student did not attempt the task.

(excerpt from *Trade and Industrial Education Service Area Resource*, Commonwealth of Virginia) (continued)

5, 4, 3, 2, 1 System

5 - The student can complete all parts of the task accurately and independently in less than the allotted time.

4 - The student can complete all parts of the task with little assistance in the allotted time.

3 - The student can complete most parts of the task accurately with some assistance.

2 - The student can complete some parts of the task but needs help on most difficult parts.

1 - The student's attempt was incomplete or incorrect.

X - The student did not attempt the task.

3, 2, 1, 0 System

3 - The student can perform task/competency above job-entry level.

2 - The student can perform task/competency at job-entry level.

1 - The student can perform task/competency below job-entry level.

0 - The student cannot perform task/competency.

X - The student did not attempt the task.

6, 5, 4, 3, 2, 1, 0 System

6 - The student can perform this task without supervision or assistance and can lead others in performing it.

5 - The student can perform this task without supervision or assistance with initiative and adaptability to special problem situations.

4 - The student can perform this task without supervision or assistance with proficiency in speed and quality.

3 - The student can perform this task satisfactorily without assistance or supervision.

2 - The student can perform this task satisfactorily but requires supervision and/or assistance.

1 - The student can perform some parts of this task satisfactorily but requires instruction and supervision to perform entire task.

0 - The student has some knowledge and limited experience but not sufficient for participation in a work environment.

1. The cognitive grade should be determined from an average of tests and quizzes.

2. The affective grade should be determined by considering the following on a 4, 3, 2, 1 or 5, 4, 3, 2, 1 or similar system:

   a. Use of correct safety procedures
   b. Good use of time
   c. Punctuality
   d. Ability to follow instructions
   e. Ability to work well with others
   f. Care of tools, equipment, and building
   g. Pride in workmanship
   h. Regular attendance.

3. The psychomotor grade should be determined from a 4, 3, 2, 1 or 5, 4, 3, 2, 1 or similar system.

4. The three grades should be averaged in the following way:

   Psychomotor grade x .5 + affective grade x .25 + cognitive grade x .25 = final grade.

CHARACTERISTICS OF RECORDING SYSTEMS FOR CBE

1. A common recording system should be used at both high school and community college levels.

2. The recording system must be an official school record and should be part of students' permanent files.

3. The recording system must contain a listing of all competencies in the occupational program.

4. A rating system should identify competencies achieved, designate the level of student performance, and provide an interpretation of the rating scale.

5. The record should include as a minimum:

   a. Occupational title
   b. Signatures of student, instructor, and school official
   c. Competency list.

H. Performance Exams

Competency-based education and occupational instruction must be performance measured. Evaluation of students achievement must be criterion referenced. A student's performance is measured and evaluated by predetermined criteria or standards. Mastery of competencies must be evaluated using criteria predetermined by a performance level equal to that required by new employees in the occupation. The tasks which compose the terminal competencies should also be performance measured.

A criterion-based testing procedure must be established for each instructional performance objective (competency or task). There must be a test item, test, or a statement of how the testing/examination will be conducted for each competency specified in the curriculum.

Curriculum materials centers are developing test-item banks and competency exams and other performance exams may currently be available. The National Occupational Competency Testing Institute at Ferris State University in Big Rapids, Michigan has for sale a variety of occupational competency exams.

If the competency and performance exams cannot be obtained from the curriculum materials centers, then they must be written for each competency and tasks. In writing the competency or task exams the following steps should be observed.

1. Study the performance objective which was written for the competency to determine specifically what performance is to be measured.

2. Next identify the standards or criteria which are used to evaluate the performance. The selected standards should be approved by members of the technical curriculum committee.

3. Determine the environment, equipment, materials, etc. which will be required to perform the competency.

4. Develop a set of instructions to be observed by the student in taking the exam.

5. Identify the individuals, and or qualifications of the individual(s) who will be responsible for administering the exam and rating the performance of the student.

6. Write instructions and prepare rating sheets to be used by the examiner.

When all of the steps above have been completed the competency exam has been prepared.

It is recommended for health occupations that the competency exams be given during the clinical period with the approved clinical supervisor(s) serving as the examiner. An example of the format for a competency exam rating sheet is presented in Figure 12.

COMPETENCY EXAM RATING SHEET
FOR

Terminal Objective:

Student _____	Competency Mastered: Yes ____ No ____
Examiner _____	Date of Rating _____

Performance Criteria	Was Performance of Student Acceptable	
	Satis-factory	Unsat-isfac-tory
1. Performs competency with accuracy or prescribed specifications		
2. Performs competency within appropriate time period		
3. Demonstrates knowledge required for performing competency		
4. Observes all safety procedures		
5. Complies with ethics of profession		
6. Demonstrates problem solving abilities		
7. Uses appropriate equipment/supplies		
8. Uses equipment/supplies correctly		

Comments: Students must receive a satisfactory rating on all criteria to demonstrate mastery.
Refer by number above

_____

Signature of examiner

Figure 12

VI

INSTRUCTOR QUALIFICATIONS

In most cases the development and implementation of a 2+2 (secondary to postsecondary) technical program will not require a change in the qualification and certification of instructors at the respective levels. However, in the case of occupations that are regulated by state licensure and/or certification differences in qualifications of instructors may emerge if the curriculum provides for occupational preparation using a career ladder approach.

The career ladder approach of the curriculum in licenced occupations may have different qualifications for instructors for each of the occupations on the career ladder of the curriculum. These differences can also be resolved very easily. The greatest problem in instructor qualifications will occur when existing secondary vocational programs are restructured to become part of the 2+2 curriculum. In many cases the current instructor meets requirements for the secondary part of the 2+2 curriculum (level of career ladder) but does not meet the qualifications for the highest occupation of the 2+2 curriculum.

It is recommended that when these differences occur the licensing boards consider the qualifications of the instructor at the various levels of the curriculum in relation to the competencies to be developed at that level. Research of and demonstration of this recommendation may reveal that present requirements for instructor qualifications are appropriate and essential for individual occupational programs but are not appropriate nor essential for a career ladder curriculum.

An attempt to resolve these difference without indepth research has been made by the staff and consultants of the 2+2 articulated curriculum for nursing education. The recommendations of the project for instructor qualification of the 2+2 nursing education program is presented in Table 7.

TABLE 7

Procedural Plan for Verification of Competency Mastery at the Secondary Level

Introduction:

The overall goal of this model "2+2" Articulated Health Occupations Project is to develop a training program that will link the last two years of secondary and the first two years of postsecondary training to prepare students for employment in one or more occupations in health careers.

Concerns:

As this project has been developed there have been questions on the part of some postsecondary nursing program personnel, as to the ability of the Non-RN instructors in secondary vocational health occupations programs, being qualified to teach and verify mastery of competencies for the RN curriculum.

This procedural plan outlines the processes for the teaching, testing and verification of mastery for both the cognitive and psychomotor competencies for this model "2+2" Articulated Curriculum for the Registered Nurse.

Curriculum Format:

Basic level knowledge and skills will be taught from a validated list of competencies in grades 11 and 12. These competencies have been assigned to courses on an "easy to difficult", simple to complex arrangement.

The courses that constitute the RN curriculum are established on the career-ladder concept; in that students must complete the courses in sequences, or take concurrently and demonstrate mastery of the competencies in each course(s) before moving on the next level. The curriculum is designed to provide exit points for the nurse aide (grade 12) and the LVN (Grade 13).

Methods of Instruction

Instructional modes will consist of the following:

1. Classroom lecture/audio/guest professional speakers
2. Classroom laboratory
3. Individualized study
4. Clinical rotation and/or cooperative (grade 11)
5. Clinical supervision and/or cooperative (grade 12)

Validating Mastery of Competencies:

Competencies in the basic course outlines have been identified as knowledge (cognitive) and performance (psychomotor).

TABLE 7 (CONTINUED)

It is recommended that the secondary health careers instructor, as certified by the Texas Education Agency, teach and administer the knowledge tests and verify mastery of the cognitive competencies on the individual student competency profile.

The performance or psychomotor competencies are to be verified for mastery utilizing the performance evaluation criteria by the clinical or cooperative supervising nurse, which will be recorded on the individual student competency profile.

The individual student competency profile will become a part of the student's "2+2" cumulative file and will move with the student as she/he moves to the next sequential course.

Rationale:

Secondary health careers instructors meeting the Texas Education Agency certification requirements for the Provisional Vocational Health Occupations certificate have the knowledge and expertize to teach and verify mastery of the basic cognitive concepts, skills and theories as defined for the grade 11 and 12 secondary courses.

VII

PROGRAM/CURRICULUM ACCREDITATION

Any new occupational curriculum is of little value to a public education institution if it has not been approved by the respective regulatory state agency. Also, if the occupation requires a state license, certificate, or the instructional program must be accreditated the curriculum is of little value if the curriculum does not have the approval of the licensing, certification, or accreditating agency or organization.

When convenient, a representative of all agencies or organizations which must approve the new curriculum should be involved during the development of the curriculum. After the curriculum is developed it should be validated by implementation. Approval to validate the curriculum, without penalty to the students, must be obtained from the regulatory agencies and organizations. The approval for the validation should be extended to all public education institutions that desire to implement the new 2+2 articulated curriculum.

VIII

2+2 DEVELOPMENT AND IMPLEMENTATION STAFF

A. Curriculum Staff

In recent years, the role of the curriculum developers has become more complex, undefinable, fragmented, and more significant in occupational preparation programs. Teacher education institutions and state education agencies have not appeared to be concerned about the qualifications and preparation of individuals who may be employed in a position responsible for the development of curriculum and instructional materials. However, it has been estimated that state agencies expend approximately twenty percent of state level vocational federal improvement funds for the development of curriculum and curriculum related projects.

Research has shown that instruction for the preparation of curriculum personnel usually consisted of adding a few unspecialized courses to an existing teacher education program. As a result, on a national basis, individuals with expertise in the area of curriculum and instructional materials development have not been prepared by education - they have emerged as a result of experience and self-study.

It is apparent that the selection of the staff and consultants for the development of the curriculum and related materials (including competency exams) must be carefully selected. The 2+2 curriculum development staff will usually consist of a manager or coordinator, and writers supported by a highly occupationally qualified and dedicated technical committee. The manager or coordinator of the 2+2 curriculum project should

have, above all other qualifications, experience in the development of 2+2 articulated curricula. Secondly, he or she must have demonstrated management and leadership skills in the educational community. Third, it would be desirable if the coordinator has had experience in curriculum development. Fourth, the individual should have had experience as an instructor and/or practitioner of the occupation(s) for which the curriculum is to be developed.

The writers (staff or consultants) must have experience as an instructor and/or practitioner in the occupation(s) for which the curriculum is being developed. The writers must also have had experience or educational preparation in curriculum development and/or be willing to participate in in-service training designed to assist them in writing the curriculum and related curriculum materials.

B. Implementation Staff

Staff of both the secondary and postsecondary levels who will be involved in the implementation of the 2+2 curriculum will include: (1) the administrator of all instruction for the campus; (2) the administrator of vocational/technical education; (3) counselors; and (4) instructors of the courses which make up the curriculum.

The success and effectiveness of the curriculum will be dependent on the understanding and support of all the staff positions listed above. Therefore, it is imperative that all of the individuals in the staff positions listed above be provided with in-service training on the design and purpose of the curriculum. They must become actively involved, respective to the role of their position, in conducting and evaluating the curriculum.

In-service training activities should be scheduled to include participation of: (1) all staff at both levels meeting together; (2) staff by position at both levels meeting together; (3) all staff meeting together by educational level; and (4) participation of program advisory committee members.

IX

STUDENT FOLLOW-UP

Data obtained from follow-up of students participating in vocational/technical education programs has been used in the evaluation of vocational education programs for more than forty years. Follow-up data on vocational/technical education students is needed for product evaluation. Follow-up data has been used to determine performance of the program. In most cases follow-up has been done only of completers and leavers of a program.

Follow-up data will also be important to the evaluation of a 2+2 curriculum. Data obtained in the follow-up of 2+2 students must include information other than that related to employment and satisfaction with training and employment. Follow-up data on leavers of 2+2 programs must include information on why the student left the program as well as the educational or employment status of the student after leaving the program.

It has been determined, after discussion with officials of the Texas Education Agency and the Texas Higher Education Coordinating Board, that the present system for conducting follow-up of all vocational/technical students is appropriate for the 2+2 student. The only difference in the procedure is that records of 2+2 participants, by 2+2 program, will be transferred from the secondary school to the postsecondary institution.

The Texas Education Agency has included space and instructions on its reporting forms to record enrollment and follow-up information on 2+2 students. It is assumed that the reporting system of the Coordinating Board will be modified in the near future to

obtain data on 2+2 students and programs. It is anticipated that both the system and the data elements for conducting follow-up of all vocational/technical education students will be revised with the passage of legislation for the reauthorization of the Carl D. Perkins Act.

X

ARTICULATION AGREEMENTS

In Texas articulation between secondary and postsecondary occupationally specific programs is mandatory for new and additional programs. This mandate was passed by the Texas legislature in attempt to reduce duplication of effort. It was anticipated that articulation efforts would be enhanced by the identification of statewide competencies for occupational specific competencies. Once the state-wide competencies are identified and/or formulated they can be used to establish a common linkage between secondary and postsecondary programs. Articulation agreements are then developed and signed which describe: (1) how the attainment of these competencies will be verified and attested at the secondary level and (2) how credit at the postsecondary level will be awarded for competency attainment at the secondary level.

The above narrative gives a brief description of the purpose and process for articulation agreements for articulating secondary and postsecondary vocational/technical programs.

The process and the secondary purpose of articulation agreements for 2+2 programs are different than that of articulating programs. First, the curriculum of the 2+2 program is articulated during the process of developing the curriculum.

The 2+2 curriculum should contain statewide competencies of the occupation(s) for which the program was developed. The 2+2 curriculum, as described in previous chapters, will include procedures to verify and attest to the attainment of the competencies at the

secondary and postsecondary level. Since the curriculum for the 2+2 program provides for a sequencing of courses, secondary will not be duplicated at the postsecondary level in the 2+2 program. Therefore, with few exceptions the articulation agreements between the postsecondary institution and the secondary institutions adopting the 2+2 curriculum will be different to agreements for the articulation of programs. Basically the articulation agreements for the 2+2 program will be a contract by which the participating institutions agree to implement and support the curriculum as written. Future modifications of the curriculum would require the approval of the Texas Education Agency, the Texas Higher Education Coordinating Board, and in the case of the health service occupations the approval of the respective state licensing or certification agency.

One exception to this articulation agreement concept would be a situation in which the postsecondary institution would be unable to conduct the postsecondary level component of a 2+2 program while concurrently conducting a regular postsecondary program which would enroll students that had not participated in the 2+2 program at the secondary level. It is recommended, if this exception occurs, that technical assistance be obtained from the Texas Education Agency and the Texas Higher Education Coordinating Board at a joint meeting to develop the articulation agreement.

Another exception, which may occur, is when a 2+2 student has completed the high school level courses but has not mastered all of the competencies of the secondary level curriculum. In this case, the articulation agreement must make a provision for the mastery of the competency(s) prior to the student continuing in the 2+2 curriculum.

XI

EVALUATION

The evaluation of all vocational/technical programs and activities is mandated at both the state and federal levels. State level mandates for evaluation of vocational/technical programs are emphasized under the "sunset provisions." Based on strong indications that state and local systems for evaluation of vocational/technical will be greatly revised under the provisions of the reauthorization of the Carl D. Perkins Act, it is not appropriate, at this time, to describe an evaluation system which should be used for determining the effectiveness of 2+2 programs.

The present evaluation systems used by the two state education agencies will suffice in the interim if the following recommendations are accepted: (1) the product standards at the secondary level (students employed, students continuing with occupational preparation) be given equal weight in the evaluation; (2) both the secondary and postsecondary institutions be involved when a 2+2 program is being evaluated; and (3) the final evaluation of the 2+2 program is completed no less than four and one-half years after the implementation of the program.

Appendix A

ARTICULATION: ESTABLISHING A DEFINITION
2+2 USER'S GROUP
TEXAS HIGHER EDUCATION COORDINATING BOARD

Articulation: Establishing a Definition
2+2 User's Group
Texas Higher Education Coordinating Board

I. GENERAL

To meet the mission of vocational and technical education in Texas to develop a skilled and educated work force, articulation must exist between all levels of education. A characterization of articulation has been provided by Cone (1979):

> Articulation can be characterized as a process, an attitude, and a goal. As a process, it is the coordination of policies and practices among sectors of the education system to produce a smooth flow of students from one sector to another. As an attitude, it is exemplified by the willingness of educators in all sectors to work together to transcend the individual and institutional self-interest that impedes the maximum development of the student. As a goal, it is the creation of an educational system without artificial divisions, so that the whole educational period becomes one unbroken flow, which varies in speed for each individual, and which eliminates loss of credit, delays and unnecessary duplication of effort.

For discussion by the Committee, the following definitions are provided. The variety is intended to describe alternative programs to meet the diverse needs of secondary and post-secondary education in Texas.

II. TYPES OF ARTICULATION

A. Horizontal Articulation: The process used to align curriculum content of two or more programs of the same type and level to assist in an efficient transition of students from one institution to the other. (Ingram and Troyer, 1982)

B. Vertical Articulation: Various processes used to coordinate the curriculum content of two or more programs of the same type at different levels to achieve an efficient transition of students from one program level to the next. (Ingram and Troyer)

1. Advanced-Skills Articulation: Secondary and post-secondary vocational programs joined together for the purpose of extending training time in order to teach higher levels of skills than can be obtained in either program separately. (Ingram and Troyer) The program usually provides a planned four-year curricula for grades 11-14 to create a strong four-year occupational curriculum that produces graduates with advanced skills.

   (a) Alternatives to this four-year model would be programs that combined the 12th and either the 13th and 14th grade or just the 13th grade level.

   (b) The advanced skills model can be extended to include an additional two years to complete a baccalaureate degree.

   (c) Another alternative is the four-year tech-prep/associates degree program that is intended to run parallel with and not replace the college-pre/baccalaureate degree program. Parnell (1985) states a tech-prep program is one which includes math, science, communications and technology in an applied setting but maintains a standard of excellence required of traditional academic programs.

2. Time-Shortened Articulation: Articulated programs in which credit for occupational competencies mastered in the secondary occupational program may be transferred and applied to the same competencies required in the post-secondary program without unnecessary duplication of time and effort. The time required to complete the post-secondary program is thus shortened. (Ingram and Troyer)

Zane (1985) offers additional terms which denote relationships between institutions:

C. Inter-Institutional Articulation: Generally referred to as that which occurs <u>between</u> institutions. For example: A high school with another school, a community college with another community college, a community college with a high school, a university with a community college.

D. Intra-Institutional Articulation: Generally referred to as that which occurs <u>within</u> an institution. For example: The Language Arts Department of a community college with the Math Department of the same community college, the 12th grade English teachers with the 11th grade English teachers of the same high school.

III. EXISTING ARTICULATION DEFINITIONS

McCormick (1980) identifies three classifications of articulation definitions and includes examples in each:

A. Process-Oriented Definitions:

1. The total effort of educational groups and individuals to discover, establish, and continually improve relationships between policies, plans, procedures, programs, and people (Planning for Continuous Occupational Education Programs, 1975). Any attempt to improve articulation without first focusing on people problems will be unproductive (Fedderson, 1977, based on Planning for Continuous Occupational Education Programs, 1975).

2. Coordination, interfacing, cooperation, understanding, acquainting, writing, combining, knowing, involving; a continuous recycling of sequences or phases that need to occur because change takes place in people, society and educational programs (Zane, 1973).

B. Goal-Oriented Definitions:

1. The planned process within the educational system which considers the transition of students from the secondary to the post-secondary levels of instruction and allows the students to move with continuity and without hindrance and duplication through the levels of the education process (A Study of the Articulation of Occupational Education Programs in New York, no date).

2. The planned process which facilitates the transition of students from secondary to post-secondary levels of instruction without unnecessary duplication or gaps in instruction, or hindrance to the process (Berg, 1979, based on Articulation: A Study by the National Advisory Council on Vocational Education, 1976).

3. A planned process linking two or more educational systems to help students make a smooth transition from one level of instruction or institution to another without delays or loss of credit (Bushnell, 1978).

C. **Both Process and Goal-Oriented Definitions:**

1. **The process of transfer and progression of students** from one level of educational offering to the next. It may be regarded as the extent to which the various levels of the education system are so interrelated as to provide for continuous educational progress of students with a minimum of repetition and a maximum of efficiency (An Approach to the Articulation and Coordination of Occupational Preparatory Curriculums from High School Through Community Colleges, 1968).

2. Articulation refers to the relationships between education programs which are designed to provide a smooth transition for the student from one educational program to another. This movement of the student between programs can be either horizontal or vertical (McKinnerney, 1974).

3. The organization of classroom instruction, co-curricular activities, and other interdependent and interrelated services of the school system so as to facilitate the continuous and efficient educational process of students from grade to grade and from school to school,---also the interrelation of the school's instructional program with the educational programs of other available institutions or work opportunities." (Good's Dictionary of Education, quoted by Canup, 1975).

4. A systematic process within and between educational systems that will facilitate the movement of students from one educational level or grade to the next, based on the interrelationship of the programs involved. The primary objective of this activity is to provide for the development of a continuum of education to allow each student to develop to his full potential without unnecessary duplication of instruction and delay in attaining his educational and career objectives (Canup, 1975).

5. The action resulting from policies and procedures employed to provide for:

   (a) vocational/occupational program alignment and continuity in a given occupational area between high schools and post-secondary institutions conducting the program;

   (b) skills and related technical information required by the student to achieve a smooth transition through the various levels of educational experience in that program;

(c) transition of the student from one educational level to another in a given occupational area without unnecessary administrative delay or duplication of effort; and

(d) improved communication and cooperation between institutions, school systems, and communities at both local area and state levels, that share interest in the same occupational program(s) (Woelfer, 1978).

IV. OPERATIONALIZATION OF AN ARTICULATION DEFINITION

A definition of articulation should be a "working one," i.e., it should be constructed in such a way as to be operationalized. It is therefore appropriate to consider activities which occur as part of the articulation process, and how they affect not only curriculum and instruction but also program management, student services, and community resources. McCormick (1980) has found the following activities to be included in each category:

A. Curriculum and Instruction Articulation Activities:

1. Information exchange via meetings and workshops
2. Cooperative inservice
3. Establishing program planning procedures
4. Cooperative labor market assessment and competency development
5. Planning articulated instructional programs
6. Developing career ladders
7. Establishing course equivalencies
8. Developing evaluation systems

B. Program Management Articulation Activities:

1. Developing goodwill and ongoing communication
2. Disseminating articulation project information
3. Industry visitations
4. Developing faculty inservice training
5. Evaluating programs as a basis for program planning and management
6. Establishing inter-institutional and intra-institutional policies and procedures

7. Constructing articulation agreements

C. Student Service Articulation Activities:

1. Workshops and meetings for counsellors (some jointly held)

2. Planning occupational goals with students

3. Using matrices for career steps in the counselling process

4. Development of information materials and a system of dissemination

5. Development of a counsellor's handbook for student advisement

6. Recruitment of students

7. Development of placement guidelines in collaboration with faculty and business representatives

8. Facilitating cooperative admissions policies and procedures

9. Instituting a system for advanced standing and credit transfer in collaboration with faculty

D. Community Resource Articulation Activities:

1. Task analyses and needs assessments

2. Planning and delivery of short-term supplemental courses

3. Collaboration in state-of-the-art faculty inservice training

4. Mentoring programs

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Appendix B

EXAMPLE OF A SURVEY USED TO VALIDATE TASK/COMPETENCIES DEVELOPED BY AN OCCUPATIONAL ANALYSIS

APPENDIX B

EXAMPLE OF A SURVEY USED TO VALIDATE TASK/COMPETENCIES DEVELOPED BY AN OCCUPATIONAL ANALYSIS

READ THIS PAGE BEFORE GOING FURTHER

Have you completed the Background Information Section? Make sure, before you continue with this procedure.

PROCEDURE A. CHECKING TASKS OF PRESENT TEACHING ASSIGNMENT

1. As you read each task in the Task section, pages 1 through 9, place check beside each task that you perform in your present assignment. Put your checkmark in the column headed "Check-If Done Now." When you have reached page 9, return to page 1.

2. DO NOT COMPLETE THE RIGHT-HAND COLUMN AT THIS TIME.

3. If a task that you perform is not listed anywhere in the entire list, write it on the blank page at the end of the booklet.

4. Do not confuse work you do yourself with work you supervise.

5. Remember, at this time you are to complete only the column headed "Check-If Done Now" for pages 1 through 9. Now, turn to page 1 and BEGIN.

PROCEDURE B. RATING TIME SPENT ON TASKS ON PRESENT ASSIGNMENT

1. Have you checked each task that you perform in your present assignment? Make sure, before you continue with this procedure.

2. Now you are to rate the relative amount of time you spend performing each task in your present assignment. Relative time spent means the total time you spend doing the task compared with the time you spend on each of the other tasks of your present assignment during the year.

3. Use a rating of "1" if you spend "very much below average" amount of time on a task. Use a rating of "2" for "below average" time; and so on, up to a rating of "7" if you spend "very much above average" amount of time on the task.

4. Remember you are to rate only tasks that you have already checked in the first column of pages 1 through 9.

5. Place your rating according to the 7-point scale, in the right-hand column, headed "Time Spent Current Assignment."

6. When you have completed all your ratings in the right-hand column of pages 1 through 9, you will have completed this Job Inventory, and you may turn it in to your Director or Dean of Vocational-Technical Education.

7. An envelope is provided for returning the Job Inventory and it may be sealed before returning it to your director who will mail it.

JOB INVENTORY

Postsecondary Vocational-Technical Instructor's Competency List		Page 6 of 9
The task (competency you perform now (✓) In the "Time Spent" column, rate only those competencies you have checked (✓) in your present assignment 1. Check (✓) only those competencies which you perform in your present assignment. 2. Do not rate any competencies until you have checked (✓) each competency that you perform. 3. Use numbers "1" through "7" to indicate the amount of time you spent on each competency which you have checked. (✓)	Check ✓ IF DONE NOW	Estimated time spent on competencies in your assignment this year. 1. Very much below average 2. Below average 3. Slight below average 4. Average 5. Slightly above average 6. Above average 7. Very much above average
MANAGEMENT (Continued)		
56. prepare purchase request for approved vocational equipment and supplies. (37)		
57. structure a filing system for records and report forms used in a vocational course. (38)		
58. supply administrators with data for vocational reports required by the state department of education. (39)		
59. provide approved safety apparel and devices for vocational students assigned to hazardous equipment. (40)		
60. maintain a record of safety instruction presented in compliance with safety laws and regulations. (41)		
61. uphold acceptable standards of student behavior in vocational classrooms and laboratories. (42)		
62. maintain an inventory of vocational tools, supplies, and equipment assigned to the laboratory. (43)		
63. establish a system for repairing and servicing tools and equipment in a vocational laboratory. (44)		
64. arrange for the storage and security of vocational supplies and equipment. (45)		
65. implement student "check-out" procedures for tools, supplies, and equipment used in the vocational laboratory. (46)		
66. schedule laboratory equipment for maximum utilization by students. (47)		

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